APPENDIX 1

Design Documentation Report and Appendices (DDR), Tetra Tech 2011

Lower Mission Creek

Reaches 1-7

Design Documentation Report

Santa Barbara, California

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United States Army Corps of Engineers
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SYLLABUS

This Design Documentation Report (DDR) presents the results of the design of the Lower Mission Creek channel, Reaches 1-7. The design presented herein follows what is presented in the *Lower Mission Creek Flood Control Feasibility Study* and the *Final Environmental Impact Statement/Environmental Impact Report* (EIS/EIR), dated September 2000.

This project is being developed under the authority of the section 101 (B) (8) of the Water Resources Development Act of 2000. The project local sponsor is the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD).

The Lower Mission Creek project is located in the City of Santa Barbara and is maintained by the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD). Lower Mission Creek extends from the Pacific Ocean upstream approximately one mile to the existing California Department of Transportation (Caltrans) built concrete-lined channel section of Mission Creek. The Caltrans concrete channel segment, upstream of Castillo Street, is currently owned by SBCFC&WCD and is being considered by the City and County of Santa Barbara for fish passage improvements to assist in the migration of steelhead and tidewater goby. (Lower Mission Creek is considered critical habitat.) This future project, with construction scheduled for the summer of 2011, in conjunction with the proposed Lower Mission Creek improvements, will assist in improving the migration of steelhead and tidewater goby. The future improvements to the Caltrans channel segment are not included in this phase of the project. Additionally, Phase I of the project from State Street to Mason Street (Reach 1A) is currently under design by the U.S. Army Corps of Engineers (Corps), Los Angeles District.

The Feasibility Report and EIS/EIR, completed in September 2000, presented the National Economic Development for flood risk management improvements on the Lower Mission Creek. The Selected Plan would increase the creek capacity to 3,400 cfs and would provide protection from floods up to the 20-year event. The improved creek would generally follow the existing alignment. The Selected Plan reduced average annual damages by $225,000 at total project first cost of about $18.2 million, with a benefit-to-cost ration of 1.2.

In November 2001, the California Coastal Commission issued a preliminary Coastal Zone Federal consistency certification for the project. Condition 3 requested that the Corps consult with specific individuals with interest and knowledge of the project for recommendations on a final design of the proposed pilot channel. The objectives of CCC Condition 3 include promoting sediment transport, minimizing channel bed erosion, reducing maintenance requirement, and protecting aquatic habitat and fish passage conditions.

In 2002, the City of Santa Barbara, with concurrence by the Corps, assembled a group of technical experts to address the channel design issue. Recommendations for the final channel design were presented in June 2005. The objective of the channel modification would be to enhance the creation of the bankfull channel and the attendant low-flow channel, that is, to facilitate the rapid formation of the channel features as soon as possible after construction and ensure that they will be stable over time. These modifications were designed to contribute to the "naturalization" of Mission Creek channel.

In December 2003, a weeklong Value Engineering (VE) Study was conducted. The VE report recommended a number of modifications to the project to reduce costs and improve the design. The Corps and the non-Federal sponsor recommended adopting four of the VE recommendations. These include mimicking a natural channel cross section with toe boulders and bankfull floodplain with vertical walls, as necessary, at the top; selectively maintaining existing vertical walls; optimizing the concrete channel wall design; and locally steepening the walls to reduce right-of-way acquisition.

The channel improvements to Lower Mission Creek consist of channel and bridge improvements along the second phase (Mason Street to Castillo Street). The proposed improvements will consist of widening and streamlining the channel bed; installing a culvert that bypasses the oxbow at the U.S. Highway 101 (US 101) (under design by SBCFC&WCD); stabilizing creek banks using riprap side slope and short vertical walls; planting of native vegetation along the riprap; and replacement of bridge crossings (by City of Santa Barbara). The creek width will range from 55 to 70 feet at the top and include structural features to mitigate and/or minimize impacts to the biological resources. In addition, the City of Santa Barbara, through separate projects, will be replacement five (5) of the existing eight (8) bridge crossings (design by others) within the project limits.

REPORTS PREVIOUSLY ISSUED

Reports previously issued by the U.S. Army Corps of Engineers and others are:

a. *"Santa Barbara County Streams, Lower Mission Creek Flood Control Feasibility Study,"* Corps of Engineers, Los Angeles District, September 2000.

b. *"Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) Lower Mission Creek Flood Control Feasibility Study,"* Corps of Engineers, Los Angeles District, September 2000.

c. *"Channel Design Recommendations Lower Mission Creek Flood Control Project,"* URS Corporation, Goleta, California, June 2005.

d. *"Phase II Assessment Report Lower Mission Creek,"* Geomatrix Consultants, Inc., October 2005.

REFERENCES

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9. EM 1110-2-2502, *"Retaining and Flood Walls"*, 29 September 1989.
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17. American Institute of Steel Construction (AISC), *"Manual of Steel Construction"*, ASD, Ninth Edition, 1989.
18. Waterways Experimental Station (WES), Corps of Engineers Computer Program, *"Concrete Strength Investigation and Design (CASTR)"*, May 1987.
19. Waterways Experimental Station (WES), Corps of Engineers Computer Program, *"Analysis of Retaining and Flood Walls (CTWALL)"*, 30 October 1993.

PERTINENT DATA

Purpose: Flood Risk Management

Item	Description
Drainage area	11.5 square miles
Creek Length	5,320 feet
100-year peak discharge at Lower Mission Creek	7,500 cfs
25-year peak discharge at Lower Mission Creek	3,800 cfs
10-year peak discharge at Lower Mission Creek	2,400 cfs
Lower Mission Creek design discharge	**3,400 cfs**
Maximum Discharge Capacity (at State Street Bridge)[1]	3,400 cfs
Maximum Non-Damaging Discharge (at Montecito Street Bridge)	1,500 cfs
Creek Top Widths (feet)	
Cannon Perdido to De la Guerra (Sta 61+36 to 57+00)	30 – 50
De la Guerra to Ortega (Sta 57+00 to 52+30)	25 – 45
Ortega to Bath (Sta 52+30 to 49+00)	25 – 35
Bath to Cota (Sta 49+00 to 46+00)	40
Cota to De la Vina/Haley (Sta 46+00 to 39+00)	25 – 40
De la Vina/Haley to Gutierrez (Sta 39+00 to 34+00)	25 – 50
Gutierrez to US 101	40 – 50
US 101 to Montecito	40
Montecito to UPRR	35
UPRR to Chapala	35 – 40
Chapala to Mason (Sta 25+00 to 17+00)	30 – 40
Mason to State (Sta 17+00 to 12+50)	30 – 60
State to Cabrillo (Sta 12+50 to 10+15	60 – 70

1. Estimated discharge capacity during plan formulation.

ABBREVIATIONS AND ACRONYMS

AE	Architect Engineer
AR	Army Regulation
CECWAR	Policy Review Branch, Policy Division, Civil Works Directorate
CECWE	Engineering and Construction Division, Civil Works Directorate
CECWEP	General Engineering Branch, Engineering and Construction Division, Civil Works Directorate
CEGS	Corps of Engineers Guide Specification
CEMPEV	Value Engineer Office, Military Programs Directorate
CFR	Code of Federal Regulations
DDR	Design Documentation Report
DM	Design Memorandum (Obsolete)
EC	Engineer Circular
EDR	Engineering Decision Report
EM	Engineer Manual
ENG Form	Corps of Engineers Form
EP	Engineer Pamphlet
ER	Engineer Regulation
FCSA	Feasibility Cost Sharing Agreement
FRC	Feasibility Review Conference
GDM	General Design Memorandum (Obsolete)
GFR	Government Furnished Property
GRR	General Reevaluation Report
HQUSACE	Headquarters, U.S. Army Corps of Engineers
HTRW	Hazardous, Toxic, and Radioactive Waste
IDC	Initial Design Conference
IPR	In Progress Review
IRC	Issue Resolution Conference
ITR	Independent Technical Review
LRR	Limited Reevaluation Report
MCACES	Microcomputer Aided Cost Engineering System
MFR	Memorandum for the Record

MP	Management Plan
MSC	Major Subordinate Command
NEPA	National Environmental Policy Act
NED	National Economic Development
O&M	Operation and Maintenance (generally used in reference to Pre-WRDA 1986 projects with Federal operations and maintenance)
OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation (generally used in reference to Post-WRDA 1986 projects with sponsor operations and maintenance)
P.L.	Public Law
P&S	Plans and Specifications
PCA	Project Cooperation Agreement
PDT	Product Delivery Team or Project Delivery Team
PED	Preconstruction Engineering and Design
PES	Project Executive Summary
PM	Project Manager
PMP	Project Management Plan (obsolete, see Management Plan)
PSP	Project Study Plan (obsolete, see Management Plan)
PRB	Project Review Board
RRC	Reconnaissance Review Conference
SACCR	Schedule and Cost Change Request
TM	Technical Manual
TRC	Technical Review Conference
USACE	U.S. Army Corps of Engineers
VE	Value Engineering
WBS	Work Breakdown Structure
WRDA86	Water Resources Development Act, 1986

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1. INTRODUCTION

GENERAL

1.1 The existing Lower Mission Creek Project is located in the City of Santa Barbara and is maintained by the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD). Lower Mission Creek extends from the Pacific Ocean upstream approximately one mile to the existing California Department of Transportation (Caltrans) built concrete-lined channel section of Mission Creek at the Castillo Street Bridge crossing (See Figure 1-1). The channel segment is divided into Reach 1A for the Phase I improvements and Reaches 1B and 3 through 7 for the second phase of the Lower Mission Creek channel improvements. The Phase I project consists of channel improvements from State Street to Mason Street (Reach 1A) and is currently under design by the U.S. Army Corps of Engineers (Corps), Los Angeles District. Phase II consists of Reach 1B extending from the proposed Mason Street Bridge to the existing railroad reinforced concrete box section, approximately 720 linear feet; Reach 3 extending approximately 300 feet from the upstream side of US 101 to Gutierrez Street; Reach 4 extending approximately 500 feet from Gutierrez Street to Haley Street; Reach 5 extending approximately 550 feet from De La Vina Street to Cota Street; Reach 6 extending approximately 500 feet from Cota Street to Ortega Street; and Reach 7 extending approximately 1,000 feet from Ortega Street to the upstream end of the project at Castillo Street. Additionally, the City of Santa Barbara is currently replacing five of the eight existing bridges along the Lower Mission Creek Channel. Bridge designs will be performed by the City of Santa Barbara and are scheduled to be constructed prior to the channel improvements.

1.2 A value engineering (VE) study was conducted by the firm Robinson, Stafford & Rude, Inc., in December 2003. The report recommended a number of modifications to the project to reduce costs and improve the design. Portions of the project that were not functionally required or that contained major portions of project costs became focus areas. The VE team generated 155 ideas for alternatives to the design, 14 of which were developed as VE recommendations. The Corps and the non-Federal sponsor agreed to adopt four of the proposed changes. These include mimicking a natural channel cross section with toe boulders and bankfull floodplain with vertical walls, as necessary, at the top; selectively maintaining existing vertical walls; optimizing the concrete channel wall design; and locally steepening the walls to reduce right-of-way acquisition.

PROJECT AUTHORIZATION

1.3 The Lower Mission Creek Flood Control Project is authorized under Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), which reads as follows:

> *"Sec 209. The secretary of the Army is herby authorized and directed to cause surveys for flood control and allied purposes,…to be made under the direction of the Chief of Engineers, in drainage areas of the United States of America and it's territorial possessions, which include the following named localities [including]:*

All streams in Santa Barbara County, California, draining the Santa ynez Mountains, except Santa Ynez River and tributaries."

PURPOSE

1.4 The purpose of this Design Documentation Report (DDR) is to provide the basis for design of the flood risk management project along an approximately one-mile reach of Lower Mission Creek that extends from the Pacific Ocean to the downstream end of the existing concrete-lined channel at the Castillo Street Bridge crossing. The project purpose is to provide protection from floods up to the design event of 3,400 cfs (approximately 20-year event). Due to the high cost of real estate in this area and the number of bridges along this reach, it was not economically feasible to consider any higher level of protection. During plan formulation the recently constructed State Street bridge was determined to be the limiting section with an estimated flow capacity of 3,400 cfs.

SCOPE OF STUDIES

General

1.5 This DDR presents the design for the recommended plan, the estimated construction cost, and the schedule for the Lower Mission Creek project. The watershed of Mission Creek and its tributary, Rattlesnake Creek, is approximately 11.38 square miles. The watershed drains the southern slops of the Santa Ynez Mountains and the urban area of Santa Barbara. The lower portions of the Mission Creek flows through the urbanized area of downtown Santa Barbara where the creek parallels US 101 until it reaches Canon Perdido Street, where it turns east and crosses Castillo, De la Guerra, Ortega, Bath, Cota, De la Vina, and Gutierrez Streets. The creek then crosses US 101, Montecito Street, Union Pacific Railroad tracks, Chapala Street, Mason Street, State Street, and Cabrillo Boulevard before entering the Pacific Ocean just east of Stearns Wharf.

1.6 Three reaches of Mission Creek are concrete lined downstream from Oak Park: (1) a 0.3-mile concrete trapezoidal channel from Los Olivos Street to about Perdido Street; (2) a 0.8-mile concrete trapezoidal channel from Arrellaga Street to about Canon Perdido Street; and (3) a 0.1-mile rectangular section with a concrete bottom and stone-walled sides located between the Union Pacific Railroad tracks and Chapala Street. The upper two reaches, which adjoin the US 101, were built by Caltrans as part of a two-phased freeway construction. The channel between Los Olivos and Pedregosa Streets was built in 1934, and the channel between Arrellaga and Canon Perdido Streets was built in 1964.

1.7 The natural creek meander downstream of US 101 created an oxbow. This oxbow was previously modified with a concrete-lined invert and vertical side walls constructed on natural sandstone blocks. The oxbow extends the length of Mission Creek between the Gutierrez and Chapala Street Bridges, where the creek makes several sharp turns to just past the Union Pacific Railroad crossing, where it joins its most direct path to the Pacific Ocean.

Surveying and Mapping

1.8 The mapping is based on Lidar method aerial topography flown in May 2003 at a scale of 1 inch = 200 feet, with 1-foot contours. Field survey information was used to supplement the 2003 topography. Horizontal control is based on the North American Datum (NAD) of 1983, California Zone 5 Grid. Vertical control is based on the North American Vertical Datum (NAVD) of 1988.

Site Explorations

1.9 Subsurface investigations were performed by Fugro for reaches 1A and 2B and Bengal Engineering for Reaches 1B, 2A and 3-7 under contract to the Corps of Engineers for the design of the Lower Mission Creek Diversion Dam Project and are presented in the Geotechnical Appendix. Additional geotechnical analysis was performed by the City of Santa Barbara's engineering consultant for various bridge projects through the project limits. These reports were utilized by Bengal and Fugro as references in the project geotechnical reports.

Coordination with Others

1.10 Extensive coordination of the design of the project was conducted. Items discussed included mapping, as-built plans, rights-of-way, easements, utility relocations, water quality and non-point source discharges, cleanup of contaminated sites, mitigation monitoring plan, and potential sources of water, disposal sites, and maintenance features.

a. Coordination occurred with the Local Sponsor. The local sponsor for the project is Santa Barbara County Flood Control & Water Conservation District (SBCFC&WCD).

Contact Person:

Jon Frye, P.E.
Santa Barbara County Flood Control and Water Conservation District
123 East Anapamu Street (2nd Floor)
Santa Barbara, CA, 93101

i. Rights-of-Way. The boundaries of the project are fairly well defined along existing county rights-of-way and easements. The plans developed in this memorandum are based on topographic mapping obtained in 2003. Rights-of-way requirements will be established in detail prior to completion of plans and specifications.

ii. Utility Relocations. Utility relocations required for the project were determined by the project team. Interfering utilities include electrical, gas, telephone, and water lines. Where possible, relocations will be accomplished in advance of the construction. Detailed information on the utility surveys and relocations is presented in Appendix B, Utility Survey Report.

iii. Other Relocations and Modifications. A number of structures will be removed as a result of this project. Existing utility service lines will need to be properly abandoned with the removal of these properties. The buildings to be demolished and the associated utility abandonments are shown in Table 1.1.

Table 1.1 Building Demolition/Service Abandonment	
Location	**Utilities**
15 W. Mason Street	Electric, Gas, Telephone, and Water
16 W. Mason Street	Electric, Gas, Telephone, and Water
134 Chapala Street	Partial Demolition
124 W. Gutierrez Street	Partial Demolition-Gas outdoor fireplace
119 W. Haley	Electric, Gas, Telephone, and Water (1 duplex structure)
434 De La Vina Street	City Bridge project - not included
512 Bath Street	City Redevelopment Project- not included
627 Bath Street	Electric, Gas, Telephone, and Water
629 Bath Street	Electric, Gas, Telephone, and Water
631 Bath Street	Electric, Gas, Telephone, and Water
633 Bath Street	Electric, Gas, Telephone, and Water
635 Bath Street	City RDA- not included
314 W. Ortega Street	City Bridge project - not included
306 W. Ortega Street	City Bridge project - not included

iv. Maintenance Items. Required maintenance features have been coordinated with the local sponsor and the project team.

Maintenance Access. Three access ramps will be provided to access the channel bottom for maintenance. The location of the access ramps are: (1) north side downstream of Canon Perdido Street with access from Castillo Street; (2) south side downstream of Bath Street with access from Cota Street; and (3) south side downstream of Gutierrez Street with access from De la Vina Street. Additionally, an access point via crane operation will allow channel access near the east side downstream of Gutierrez Street Bridge near the inlet of the overflow culvert.

b. Coordination with Other Agencies included:

United States Fish and Wildlife Service (USFWS)

National Marine Fisheries Service (NMFS)

California Regional Water Quality Control Board (CRWQCB)

California Department of Fish and Game (CDFG)

California Coastal Commission (CCC)

State Historic Preservation Officer (SHPO)

Santa Barbara County Flood Control & Water Conservation District (SBCFC&WCD)

City of Santa Barbara

PROJECT LOCATION AND DESCRIPTION OF DRAINAGE AREA

1.11 Mission Creek is located in the City of Santa Barbara, California, approximately 100 miles northwest of the City of Los Angeles. The Mission Creek watershed is approximately 11.38 square miles. The watershed drains the southern slopes of the Santa Ynez Mountains and the urban area of Santa Barbara. The lower portions of the creek flow through the urbanized area of downtown Santa Barbara. The project addressed in this DDR is the last mile of the creek, beginning just downstream of Canon Perdido Street to Cabrillo Boulevard Bridge just before the creek enters the Pacific Ocean (See Figure 1.1).

Figure 1.1 Project Location Map

2. DESCRIPTION OF FEASIBILITY REPORT DESIGN

GENERAL

2.1 The Selected Plan would increase the creek capacity to 3,400 cfs and would provide protection from floods up to the 20-year event. The improved creek would generally follow the existing alignment. The natural creek bottom would be maintained and existing concrete bottom in some areas would be removed and restored to natural. Improvements to the creek would include creek widening, bridge replacements, streamlining bed slopes, stabilization and protection of creek banks using vertical walls and vegetated riprap side lopes, and installation of an overflow culvert that would bypass the oxbow between the US 101 and the Chapala Street Bridge.

2.2 Several land parcels along the streambanks would be designed and planted to expand the riparian corridor habitat. Structural features to mitigate impacts to biological resources would be implemented. These include fish ledges, tidewater goby current refugia, fish baffles, boulder clusters, and a weir structure at the inlet of the overflow culvert.

CHANNEL MODIFICATIONS

2.3 In the proposed configuration, minimizing the width of the top of the channel was a primary design objective to minimize the right-of-way (ROW) required. The proposed channel design would consist of a natural creek bottom, with either vertical concrete walls or a combination of a vertical wall and vegetated riprap side slope. The combination riprap and vertical wall would be the predominant bank treatment upstream of the US 101, except in two short reaches just upstream of the Haley-De la Vina Bridge and the De la Guerra Bridge. Below the US 101, the combination riprap and vertical wall would be constructed along the southeast bank, beginning at the midpoint of the Chapala Street Bridge and Mason Street Bridge to the midpoint of the Mason Street Bridge and State Street Bridge. Vertical walls would be installed along the remainder of the project reach. Where sufficient ROWs exist, the vertical walls would be constructed with an inverted “T” footing. A pier footing would be used in areas with limited ROWs.

2.4 For the half-height walls, the upper half of the channel walls would be 2H on 1V backfill and would be protected with riprap. This slope would accommodate vegetation growth and riparian habitat. The 18-inch riprap would be covered with topsoil to accommodate establishment of a ground cover. Concrete pipe planters, varying in size, would be placed in the riprap for planting of native trees and vegetation.

2.5 A “pilot channel” would be established on the creek’s invert. This would provide a permanent low-flow path and prevent a uniform flat channel bottom along the reach above US 101. The alignment of the pilot channel would be allowed to naturally vary, but initiated along the center of the channel invert. The pilot channel would be sized to accommodate a minimum flow of 50 cfs. It would likely be trapezoidal in shape, approximately 10 to 12 feet wide, and about 1.5 foot deep.

OXBOW BYPASS

2.6 The Selected Plan would bypass the oxbow with two 18-foot wide by 6-foot high box culvert connecting both ends of the oxbow. The culverts would be constructed under the Union Pacific Railroad (UPRR) and would create a high-flow bypass for the oxbow. This bypass would provide a direct path for the creek across the oxbow, from just upstream of the US 101 extending to the downstream end of the Chapala Street Bridge. A weir would be constructed at the inlet to the culvert to direct flows of up to 640 cfs through the oxbow to maintain minimum flows for fish. The weir would split the higher flows between the oxbow and the bypass. The historic Potter footbridge, downstream of the UPRR crossing, would remain in place. In addition, the historic sandstone walls along this reach would remain in place.

BRIDGES

2.7 To increase the capacity of the channel, the following bridges would be replaced: Ortega, De la Vina/Haley, Cota, and Mason Street.

BIOLOGICAL RESOURCES FEATURES

2.8 Five small parcels of open land would be left along the banks after completion of project construction. Each would be designed to expand the corridor of riparian habitat to be planted along the stream banks and to provide for passive park space for residents. Native trees would be planted in the habitat expansion zones. Pathways and benches may also be added to create passive park spaces in some of these zones.

2.9 The aquatic habitat features for protection the endangered tidewater goby would primarily be in the estuary area, from Mason Street Bridge to State Street Bridge; the segment between State Street Bridge and Cabrillo Blvd. Bridge is not included in the project construction but would contain future habitat features to be constructed by others. Additional aquatic habitat features would also extend into the upper reaches of the project, which would create a habitat conducive to reestablishing a native steelhead population. Energy dissipators would be installed by placing clusters of large boulders embedded into the riprap fields. These boulders would dissipate the force of the currents at vulnerable points along the creek as well as provide natural turbulence and heterogeneity to the stream to improve the aquatic habitat for steelhead.

2.10 To minimize the effects to the tidewater goby from the installation of vertical walls, tidewater goby refuge would be created with artificial overhangs projecting from the walls (fish ledges) combined with double rows of boulders (fish baffles). Side slopes with riprap would be planted with ground cover and shrubs that would help develop the understory of the larger riparian canopy along the creek.

3. ALTERNATIVES EVALUATED AFTER THE FEASIBILITY REPORT

VALUE ENGINEERING STUDY

3.1 A value engineering (VE) study was conducted in July 2003 to evaluate potential project modifications resulting in cost savings and an improved project. The VE Team generated 155 ideas for alternatives, 14 of which were developed as VE recommendations. The VE Team then reviewed the composite list to identify optimum combinations of the recommendations. These combinations are shown in Table 3.1.

Table 3.1 VE Team's Optimum Combination

Idea No.	Idea Description	Life Cycle Cost Savings
INCREASE CAPACITY (C)		
C-01	Mimic a natural channel cross section with toe boulders and bank full flood plain with vertical walls as necessary at the top	$5,397,000
C-05	Eliminate Mason Street bridge	$894,000
C-06	Eliminate Gutierrez Street bridge	($66,000)
C-11	Eliminate channel widening below State Street	$169,000
C-27	Selectively maintain the existing vertical walls	$289,000
C-28	Optimize the concrete channel wall design	$898,000
C-45	Locally steepen the walls to reduce ROW acquisition	$299,000
C-73	Downstream of Yanonali Street install a reinforced concrete box (RCB)	$171,000
ENHANCE ECOSYSTEM (E)		
E-37	Exclude gobies from the channel during construction	$960,000
	Total	$9,011,000

3.2 Four of the above optimum combinations were adopted and further evaluated. These included C-01, C-27, C-28, and C-45.

3.3 C-01: Mimic a natural channel cross section with toe boulders and bankfull floodplain with vertical walls as necessary at the top. This recommendation provides a highly stable, fully vegetated streambank that eliminates the need for extensive excavation, dewatering, and shoring during toe wall construction. The design concept includes toe boulders and bankfull floodplains as part of the slope design. It includes habitat features integral to the slope. In addition to riprap or boulder toe protection, this recommendation includes willow planting at the toe of the slopes. Willows provide additional scour protection as well as shade and refuge for both aquatic and terrestrial wildlife.

3.4 C-27: Selectively maintain the existing vertical walls. The plan, as recommended in the feasibility report, proposed to demolish an existing 40-foot long historic sandstone/concrete wall on the right bank downstream of Yanonali Street and replace it with pile wall. This VE recommendation will leave the wall in place and provide toe protection.

3.5 C-28: Optimize the concrete channel wall design: The feasibility report proposed a concrete wall at the base of the slopes. This wall has a significance footing buried into the slope. To construct the footing, the slope will have to be excavated on a 1H:1V until it daylights at the top of the bank. The recommended VE concept reduces the size of the footing, which reduces the costs for excavation, backfill, concrete, and rebar.

3.6 C-45: Locally steepen the walls to reduce ROW acquisition: The feasibility report proposed the removal of a two-story duplex on the left bank downstream of Haley Street to construct an inverted T-wall and riprap the slope. The recommended VE concept will provide a full height retaining/channel wall sufficiently steep to save the existing structure, which will eliminate the need to relocate two families.

DESIGN REFINEMENTS

3.7 In addition to the recommendations presented in the VE study, other refinements to the design were developed. These are discussed in the following paragraphs.

Pilot Channel

3.8 The feasibility report proposed a pilot channel at the end of construction that would provide a permanent low-flow path and prevent a uniform flat channel bottom along the reach above US 101. The pilot channel would accommodate 50 cfs and would likely be 8 to 10 feet wide and 1 to 2 feet deep. The overall intent of the pilot channel is to concentrate low flows, particularly near the fish ledges, to provide year-round aquatic habitat.

3.8.1 In November 2001, the California Coastal Commission (CCC) issued a preliminary Coastal Zone Federal consistency certification for the project. Condition 3 requested that the Corps consult with specific individuals with interest and knowledge of the project for recommendations on a final design of the proposed pilot channel. The objectives of CCC Condition 3 include promoting sediment transport, minimizing channel bed erosion, reducing maintenance requirement, and protecting aquatic habitat and fish passage conditions.

3.8.2 In 2002, the City of Santa Barbara, with concurrence by the Corps, assembled a group of technical experts to address the channel design issue. Recommendations for the final channel design were presented in June 2005. The objective of the channel modification would be to enhance the creation of the bankfull channel and the attendant low-flow channel, that is, to facilitate the rapid formation of the channel features as soon as possible after construction and ensure that they will be stable over time. These modifications were designed to contribute to the "naturalization" of Mission Creek channel and are to be provided between Canon Perdido to upstream of US 101.

3.8.3 *Establish pools.* Pools would be established at the locations of the existing pools at the time of construction by excavating the channel below the design elevation for the channel bottom. The depths of the new pools would be 75 percent of the depths of the existing pools. A shallower depth is proposed to retain some channel bed material for scouring and redeposition during the first few years after construction. To maintain these pools, grade control structures would be installed at the head of each new pool.

3.8.4 *Initialize the formation of a low-flow channel*. The channel between pools would be graded with a slight cross slope that reflects the location of the existing thalweg prior to construction. Thus, if the thalweg is located along the west bank, the new and wider channel would be graded with a slight grade towards the west bank. This will enhance the formation of the low-flow channel within the larger bankfull channel.

3.8.5 *Relocate fish baffles to center of channel*. The rocks would be reconfigured as more numerous "rock clusters" in the center of the channel, placed at 100- to 150-foot spacing between pools. Placement of the rocks in the center of the bankfull channel would maximize the potential for the rocks to occur in year-round flows. The rock cluster would consist of 3 to 5 individual rocks placed in close proximity.

3.8.6 *Remove fish ledges*. The technical experts concluded that fish ledges would not be effective and recommended to eliminate this component from the project between Canon Perdido to upstream of US 101. The ledges could become stranded over time if the low-flow channel migrated to the other side of the larger channel, or the channel becomes lower; in both cases, the fish ledges would become ineffective. The group believed that the establishment of pools using grade control structures would provide a greater amount of pool habitat that would be self-sustaining.

3.8.7 *Reduce or modify rock energy dissipators at two bridges*. A riprap channel bottom would be installed 150 feet upstream and downstream of the existing bridges at De la Guerra Street and Gutierrez Street. The riprap lining would prevent channel bed scour at these bridges due to anticipated higher velocities. Two issues were brought forward by the technical experts: the overall lengths of the rock lining and the potential for the rock channel bottom to become a fish migration barrier. To address these, the following recommendations were developed: consider other design features, during final design, to address the potential scour problems at these bridges that would reduce the length of the riprap channel lining; and rock or concrete structures on the channel bottom at these bridges should be notched for a low-flow channel to allow fish passage.

3.8.8 *Implement adaptive management plan*. In the case that a persistent low-flow channel and series of pools are not forming after several winters, the Corps and the City, in consultation with NOAA Fisheries, CDFG, and members of the Channel Design Working Group, would review the performance of the proposed channel modifications and consider changes/adjustment to the design.

Expanded Habitat Zones

3.9 The feasibility report recommended utilizing five small parcels of open land to serve a dual purpose: to expand the corridor of riparian habitat to be planted along the streambanks, and to provide passive park space for area residents. In addition to the five locations, another habitat expansion zone just upstream of US 101 was identified in the EIR/EIS. However, this parcel, currently owned by Caltrans, is not available for expansion and has been eliminated from further consideration.

Access Ramps

3.10 The 3 access ramps identified in the feasibility report will be designed to access the channel bottom for construction and maintenance. The access downstream of Canon Perdido will be relocated to obtain access from Castillo Street to eliminate the need for additional right of way and easements through the church parking lot. These access ramps are located at: (1) north side downstream of Canon Perdido Street with access from Castillo Street; (2) south side downstream of Bath Street with access from Cota Street; and (3) south side downstream of Gutierrez Street with access from De la Vina Street.

4. SELECTED PLAN

GENERAL

4.1 The Selected Plan for the Lower Mission Creek Project consists of flood risk management improvements for approximately the last mile of the creek between the Canon Perdido Street Bridge at the upstream end and the State Street Bridge near the outlet; replacement of four bridges, streamlining bedslope, installing a culvert that bypasses the oxbow, stabilizing creek banks using vertical walls and riprap sideslope; and planting of native vegetation along the riprap. The creek width will range from 55 to 70 feet at the top. The average depth of the creek will be 8 to 12 feet throughout the project reach.

4.2 The Selected Plan will increase the channel capacity to 3,400 cfs and provide approximately a 20-year level of flood protection. The improved creek will generally follow the existing alignment and would incorporate a new culvert between US 101 and the Chapala Street Bridge that would carry high flows and bypass the oxbow.

4.3 Several land parcels along the stream banks will be designed and planted to expand the corridor of riparian habitat. Additional structural features will be implemented to avoid, minimize, and mitigate impacts to biological resources. These features include installing fish ledges, tidewater goby current refugia (goby hideouts), fish baffles, boulder clusters, and a weir structure at the inlet of the overflow culvert.

REMOVAL OF EXISTING BANK PROTECTION AND EARTHEN MATERIAL

4.4 The creek bottom and banks between the Canon Perdido Street and State Street Bridges will be excavated to increase the creek capacity to provide a 20-year level of flood protection to the City of Santa Barbara. All existing banks within the project reach will be removed except for a retaining wall located upstream of De la Guerra Bridge, and both banks along the oxbow between US 101 and the Chapala Street Bridge. The excavation of the channel will begin from the downstream end of the project near State Street and progress upstream.

4.5 Approximately 65,500 cubic yards of material will be excavated from creek banks and creek bottom. Channel excavation may last for about 130 to 180 days for each phase; however, excavation and construction activities, including bank stabilization and construction of bridges, will be accomplished at the same time when funding allows. At this time the City is proceeding with bridge improvements ahead of the channel and bank stabilization improvements.

STABILIZATION OF CREEK BANKS

4.6 The existing creek banks will either be replaced with the combination short walls and riprap sideslopes or vertical walls. The vertical walls will be constructed in two methods according to their proximity to any existing structures. The first method will use an inverted “T” footing, a less expensive construction method, which will be applied in areas where sufficient right-of-way are available without directly impacting existing structures. The second method will use a soldier pile or secant pile walls, which will be applied in areas with limited right-of-way

and close proximity to structures. Typical cross-sections of these designs are shown in Appendix H.

4.7 Where the riprap vertical wall is used, the height of the wall will be approximately half the depth of the creek. The riprap sideslope will be built at a 2H:1V slope. Pipes of varying sizes (up to a maximum of 3 feet in diameter) will be placed vertically in between the riprap sideslope to allow planting of native trees and vegetation. The riprap sideslope will be covered with topsoil and planted with ground cover and shrubs that will help develop the understory of the larger riparian canopy along the creek.

REPLACEMENT OF EXISTING BRIDGES

4.8 To increase the conveyance capacity of existing bridges up to the design flow of 3,400 cfs, some form of minor modifications may be required. In four cases, removal and replacement of the entire structure will be needed to increase capacity. These bridges include the Ortega Street, Cota Street, Haley Street, and Mason Street Bridges. Bridge reconstruction will start with the most downstream bridge, Mason State Bridge, and progress sequentially in the upstream direction ahead of the creek improvements. Additionally, the City is proposing to construct the Cabrillo Blvd Bridge as a separate project and improvement.

WEIR INLET AND CULVERT THAT BYPASSSES THE OXBOW

4.9 The oxbow runs the length of the creek between the Gutierrez and the Chapala Street Bridges, where the creek makes several sharp turns while crossing US 101, the Montecito Street Bridge, and Union Pacific Railroad before joining its most direct path to the Pacific Ocean (Figure 4.1). The culvert (two 18-foot wide by 6-foot high boxes), referred to as the overflow culvert or the "oxbow bypass," which connects both ends of the oxbow will follow a more direct path across the oxbow. It will begin upstream of US 101, cross the highway (where Caltrans had built a span to accommodate such a crossing to eliminate impacts to highway traffic), Montecito Street, and the railroad tracks before rejoining the creek alongside the downstream end of Chapala Street Bridge.

4.10 The culvert alignment will be outside the Moreton Bay Fig tree dripline to minimize impacts to its major root system. The culvert will be covered across Montecito Street to its confluence at the downstream end of the Chapala Street Bridge; however, it will not be covered across US 101. A weir structure will be built at the inlet of the culvert to control the flows across through the culvert and the oxbow. The height of the weir will be set in order to direct lower flows of up to 640 cfs through the oxbow. In addition, the weir will split higher flows (up to the design conveyance capacity of 3,400 cfs) between the culvert and the oxbow. The culvert divider will be designed to form a "bullnose" and help minimize the potential of debris blockage.

PILOT CHANNEL

4.11 The channel will be graded such that there is a defined pilot channel that will direct low flows and provide year-round aquatic habitat. The pilot channel will constitute a permanent component of the instream habitat between Canon Perdido and US 101. The pilot channel will be large enough to accommodate 50 cfs. The pilot channel will have an average width of 12 feet and

about 1.5 feet deep with sideslopes built at 2H:1V slope. The bottom of the channel would be lined with gravel and cobbles.

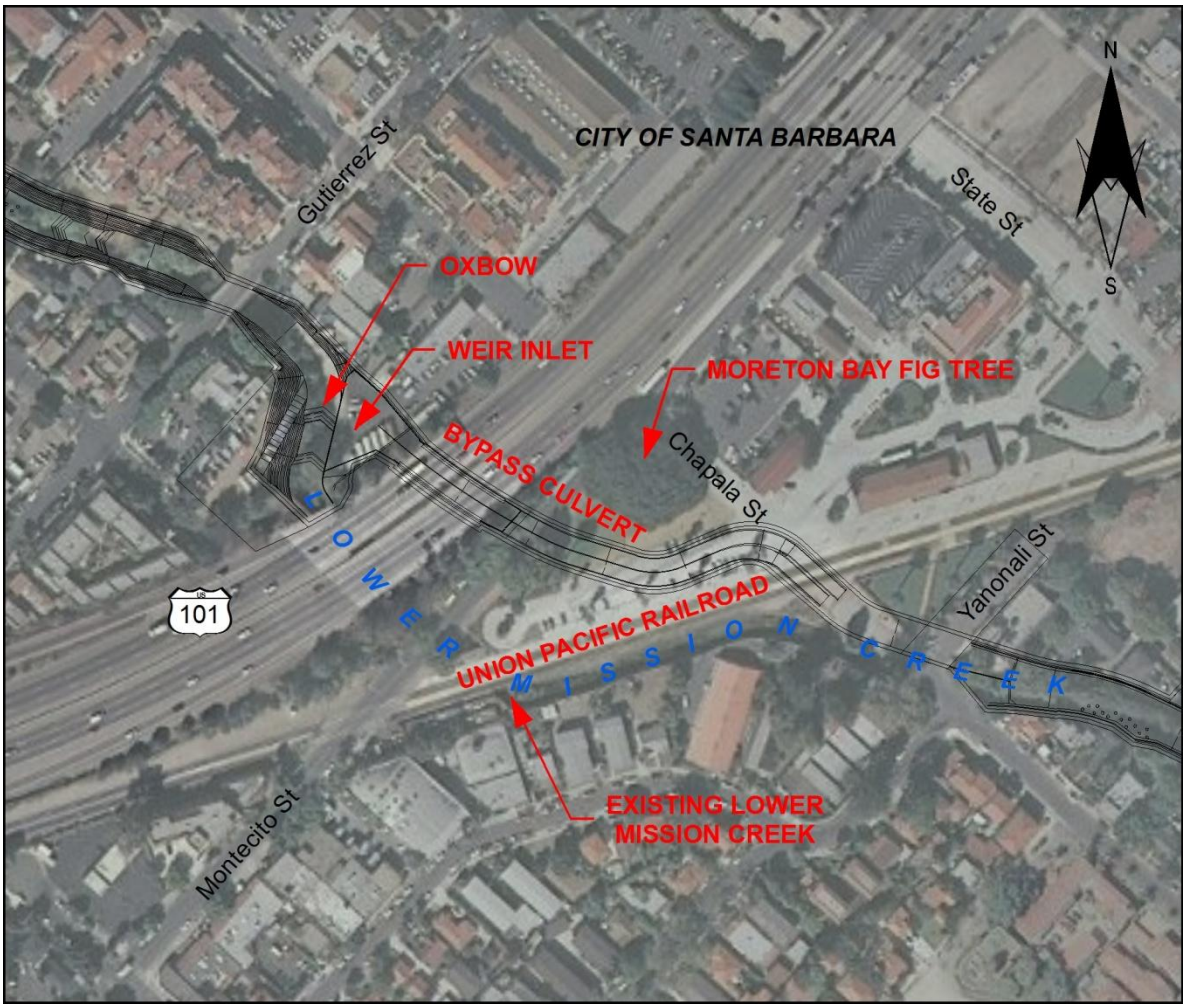


Figure 4.1 Oxbow Bypass Culvert Location Map

FISH POOL/GRADE CONTROL STRUCTURES

4.12 Six 2.5-foot high fish pool/grade control structures will be located along the Lower Mission Creek channel. The structures consist of a 2.5-foot deep rip rap structure that spans the channel invert, the grade into and out of the structures will consist of stone slope at 20 percent, an approximate 65-foot long by 2.5-foot deep pool area is utilize to provide a resting location for migrating fish.

EXPANDED HABITAT ZONES

4.13 Five small parcels of open land, ranging in size between 0.03 and 0.14 acres, will be available along the banks after completion of project construction (Figure 4.2). These open land parcels will be designed to serve two purposes: expand the corridor of riparian habitat to be planted along the streambanks and provide passive park space for residents. Native trees,

primarily western sycamores, cottonwoods, and coast live oak, will be planted in the habitat expansion zones. In some of these zones, pathways and benches may also be added to create passive park spaces.

4.14 Planting along the riprap and planting of native trees in these zones are an integral part of the project design. The ecological values generated by these features will offset impacts from the implementation of the proposed project on existing streambank vegetation.

Figure 4.2 Expanded Habitat Location Map

STRUCTURAL FEATURES TO AVOID, MINIMIZE AND MITIGATE IMPACTS TO BIOLOGICAL RESOURCES

4.15 Several structural features will be included to avoid and mitigate impacts to biological resources. These permanent and durable mitigation features will create hiding places where fish may take refuge. These will be composed of three separate structural elements formed by coarse surface relief of the walls (goby refugia), rock fish baffles at periodic locations in the center of the channel, and rock energy dissipators.

4.16 Goby Refugia. The goby refugia, where gobies and other small fish could escape strong currents, will be incorporated into the grout lines between the simulated sandstone blocks in the retaining wall. The grout lines will be 2 inches deep and taper from 3 inches at the opening to 0.75 inches at the full depth of the grout line. The horizontal grout spaces will be filled with grout for a few inches at 10-foot intervals to create eddies and slower moving water behind the grout barriers.

4.17 The grout lines will extend from the ordinary high water mark to the bottom of the formed wall, roughly 8 feet in vertical length. Water in the estuary will cover them completely most of the time, and each will extend well below the streambed. Small fish the size of gobies will easily find the recesses on their downstream side and take advantage of the refugia from currents created by these structures.

4.18 Fish ledges with boulder clusters will be provided for additional Goby Refugia. The ledges will be constructed approximately 21 inches above the channel bottom and extend about 20 inches into the channel. A boulder cluster consisting of 3 rocks will be provided between the fish ledges (Figure 4.3). The fish ledges are to be located within the estuary section.

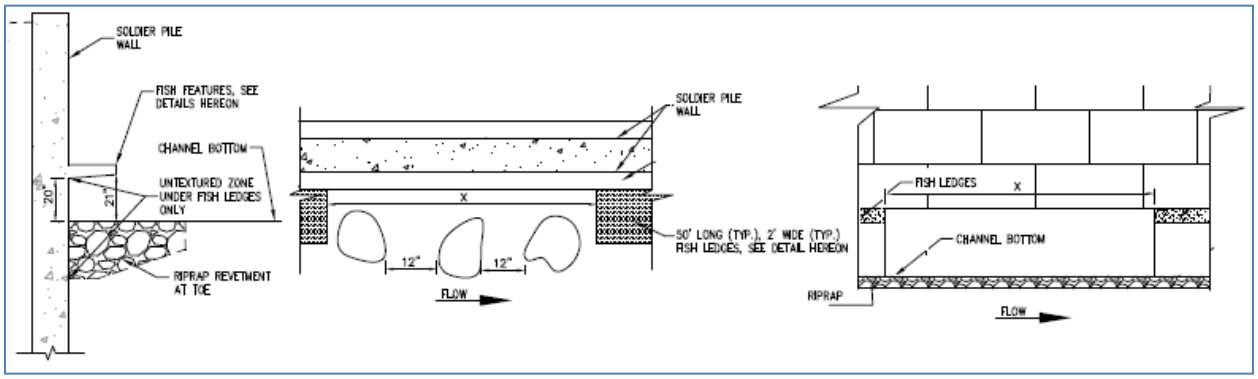


Figure 4.3 Fish Ledges

4.19 Fish Baffles. The rock baffles will provide habitat for fish amongst the rocks on the channel bottom and improve hydraulic conditions in the channel for fish migration by providing backwater areas for resting. The rocks will be configured as "rock clusters" in the center of the channel, placed at 150- to 200-foot spacing between pools. The rock cluster will consist of 6 to 9 individual rocks, approximately 3 to 4 feet in diameter each, placed approximately 8 feet apart (Figure 4.4). The rocks will protrude 18 to 24 inches above the channel invert.

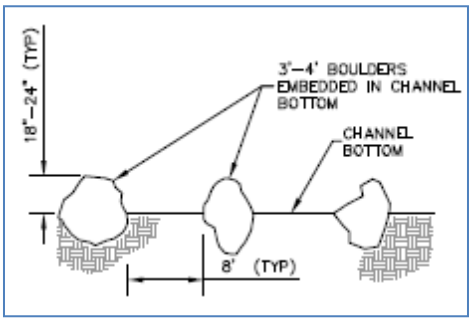


Figure 4.4 Fish Baffles

4.20 Design restrictions prevent their placement under bridges, for a certain distance on the upstream side of bridge abutments, and directly opposite other baffles. Rock baffles will be installed over approximately 100 linear feet.

4.21 Rock Energy Dissipators. The rock energy dissipators will have two functions: dissipate the force of currents at vulnerable places along the creek and impart natural turbulence and heterogeneity to the stream to improve the aquatic habitat for steelhead.

4.22 Rock energy dissipators will be located in two reaches. The streambed will be armored with riprap and boulders in areas where undesirable high velocity flows could be expected. The more upstream reach will extend from Canon Perdido Street to below the Ortega Street Bridge; the second will extend from upstream of the Gutierrez Street Bridge to the upper bend of the natural oxbow, immediately upstream of US 101. In the final design, the rock energy structures will be reviewed for more environmentally friendly options, such as burring the structures or eliminating them.

REACH-BY-REACH CREEK IMPROVEMENTS

4.23 The detailed improvements described below are segmented between successive bridge crossings. The left and right banks are described while facing downstream (i.e. right will be towards the west and left towards the east).

Reach 7

Canon Perdido Street Bridge to De la Guerra Street Bridge (Station 61+36 to 57+00)

4.24 Canon Perdido Street Bridge marks the upstream boundary of the project. Between Canon Perdido Street and De la Guerra Street, the creek would be 63 feet wide at the top of bank with an average depth of 16 feet. The right bank will mostly consist of the toe wall and riprap sideslope, except for the section just upstream of De La Guerra Street Bridge, where vertical wall will be used. The left bank will maintain the existing retaining wall along the last two-thirds of its length; the upstream remainder of the left bank will consist of vertical wall with riprap sideslope. A maintenance access ramp will be incorporated on the left bank. A fish pool/drop structure will be installed at Station 61+00. A habitat expansion area will be created on the creek terrace along Castillo Street. The creek bed along this reach will be armored with riprap and boulder clusters to act as energy dissipators.

De la Guerra Street Bridge to Ortega Street Bridge (Station 57+00 to 52+30)

4.25 The creek will be 63 feet wide at the top of bank along this reach with both banks consisting of toe wall and riprap sideslope, except for a short reach on the left immediately upstream of the Ortega Street Bridge where full height vertical walls will be used to avoid impacts to a culturally significant structure. This reach will have an averaged depth of 14 feet. The invert slope will be streamlined requiring excavation and removal of 1 to 4 feet of streambed. Approximately 100 feet of streambed immediately downstream of the De la Guerra Street Bridge and upstream of the Ortega Street Bridge will be armored with riprap and cluster of boulders to act as energy dissipators. A fish pool/drop structure will be installed in the reach between the two boulder clusters at Station 55+00. A parking structure along the left bank will be removed to accommodate the wider channel. The Ortega Street Bridge will be rebuilt and sized to accommodate the higher-than-existing design flow. The existing trees located directly downstream of the De La Guerra Street bridge will be protected in place. If during construction, protection of the trees is not possible then the removal of the trees will be allowed. All effort shall be made to protect the existing trees at this location.

Reach 6
Ortega Street Bridge to Bath Street Bridge (Station 52+30 to 49+00)

4.26 The creek will be a minimum of 63 feet wide at the top of bank along this reach with both banks consisting of vertical wall-riprap sideslope averaging 15 feet in depth. The invert slope will be streamlined requiring excavation and removal of 1 to 3 feet of streambed. Approximately 100 feet of streambed immediately downstream of the Ortega Street Bridge will be armored with riprap and cluster of boulders to act as energy dissipators. Downstream of the boulders, a fish pool/drop structure will be installed.

4.27 Three residential properties and two garage structures along the left bank will be removed to allow for creek widening. One structure, located at the corner of Bath and Ortega Streets, will be additional purchased by the City of Santa Barbara for the construction of a “tot lot” park next to the passive park. The Bath Street Bridge will remain in place and convey the design flow. The remnants of the acquired properties will be planted with native trees and vegetation, creating a habitat expansion zone and possible a passive park space.

Bath Street Bridge to Cota Street Bridge (Station 49+00 to 46+00)

4.28 This reach occupies the northeast corner of Cota Street and Bath Street intersection. The creek will be widened averages approximately 70 feet at the top of bank. The left bank will be protected with a vertical wall. The existing maintenance access ramp on the right side fronting Cota Street will be kept in place. The Cota Street Bridge will be rebuilt and sized to accommodate the higher-than-existing design flow.

Reach 5
Cota Street Bridge to Haley-De la Vina Street Bridge (Station 46+00 to 39+00)

4.29 The upper half of this reach, Cota Street Bridge to Station 43+00, will be widened to 63 feet wide at the top of bank with both side consisting of vertical wall-riprap sideslope (except for

a short reach immediately downstream of the Cota Street Bridge where vertical walls will be used to preserve a culturally significant structure). On the downstream half, the left bank protection will transition from a toe wall-riprap sidelope into a vertical wall across the multipurpose property located between Station 43+30 and 41+70, where the top width narrows to 55 feet. The invert slope will be streamlined requiring excavation and removal of 2 to 3 feet of the streambed. This reach will have an average depth of 16 feet. Approximately 100 feet of streambed downstream of the Cota Street Bridge (Station 45+00) and just upstream of Haley-De la Vina Street Bridge will be armored with riprap and cluster of boulders to act as energy dissipators. A fish pool/drop structure will be installed (Station 42+83.41) between the two boulder locations.

4.30 A patio deck located at 532 Bath Street will be removed to allow for creek widening. The Haley-De la Vina Street Bridge will be rebuilt and sized to accommodate the higher-than-existing design flow.

Reach 4
Haley-De la Vina Street Bridge to Gutierrez Street Bridge (Station 39+00 to 34+00)

4.31 The creek will be widened to 71 feet at the top of bank along this reach with both banks consisting of the toe wall-riprap sideslope, except for a short reach on the east side immediately upstream of the Gutierrez Street Bridge, where a vertical wall will establish a transition from the east bank into the bridge. The reach will have an average channel depth of 9 feet. The invert slope will be streamlined requiring excavation and removal of 2 to 4 feet of streambed. Approximately 100 feet of streambed downstream of the Haley-De la Vina Street Bridge (Station 38+20) will be armored with riprap and cluster of boulders to act as energy dissipators. Immediately downstream of the boulders, a fish pool/drop structure will be installed.

4.32 Two residential properties, located at 434 De la Vina Street and 119 West Haley Street, will be removed to allow for creek widening. The remnants of the 434 De la Vina Street property will be planted with native trees and vegetation creating a habitat expansion zone and possibly a passive park space. Approximately 100 feet of streambed upstream of Gutierrez Street Bridge would be armored with riprap and a cluster of boulders to act as energy dissipators.

Reach 3
Gutierrez Street Bridge to Highway 101

4.33 The reach from Gutierrez Street Bridge to Station 32+50 (beginning of Caltrans property) will continue to be 71 feet wide at the top of bank with banks consist of the toe wall-riprap sideslope. A low-flow diversion weir will run along the left side and connect to the overflow culvert near the upstream face of Highway 101. The depth of the creek along this reach will average at about 9 feet. The toe wall-riprap sideslope on the right bank will terminate just inside the Caltrans property line approximately 120 feet downstream of the Gutierrez Street Bridge. The remaining section of the right bank will be protected entirely with riprap. A fish pool/drop structure will be installed upstream of Highway 101 (Station 231+53.13).

4.34 The higher flows across this reach will be divided between the existing channel (oxbow) and the overflow culvert. The oxbow will continue to convey the base flow and low-discharge

events up to 640 cfs (equivalent to an event with a 2.3-year return interval). During larger events, the new culvert will carry two-thirds of the design capacity, with the remaining third conveyed by the oxbow.

New Overflow Culvert that Bypasses the Oxbow between Highway 101 and Chapala Street Bridge

4.35 The new culvert across the existing opening under Highway 101 will consist of a pair of 18-foot-wide by 6-foot-high open channels. Below Highway 101, the culvert will be covered before it crosses Montecito Street and until it terminates alongside the downstream end of the Chapala Street Bridge. The open channel will be approximately 200 feet long while the covered section will be 640 feet in length. The covered portion of the culvert will cross under the Amtrak passenger platform before crossing under the railroad tracks. Approximately 50 feet of streambed immediately downstream of the overflow culvert outlet will be armored with riprap to act as energy dissipators. To avoid any potential impact to the Moreton Bay Fig tree, the culvert is aligned approximately 50 feet outside its dripline.

Reach 1

Chapala/Yanonali Street Bridge to Mason Street Bridge (Station 22+00 to 17+00)

4.36 The creek will be widened to 55 feet at the top of bank along this reach with both banks consisting of the vertical channel walls with riprap toe protection. The reach will have an average channel depth of 11 feet. The invert slope will be streamlined requiring excavation and removal of 0 to 1 foot of streambed. Approximately 200 feet of the existing right channel wall will remain. Rip rap toe protection will be provided along the proposed and existing channel walls. Immediately downstream of the confluence of the existing Lower Mission Creek Channel and the Oxbow Bypass culvert a fish baffle (consisting of cluster of boulders) will be provided (*approx. Station 20+00 and Station 18+00*). A fish ledge will be provided directly upstream of the fish baffle at station 18+00. The remnants of the acquired properties along the left bank will be planted with native trees and vegetation, creating a habitat expansion zone.

Mason Street Bridge to State Street Bridge (Station 16+50 to 12+50)

4.37 The creek will be widened to 55 feet at the top of bank along this reach with both banks consisting of the vertical channel walls with riprap toe protection. The channel width will be reduced to approximately 51 at the existing pedestrian bridge. The existing pedestrian bridge will be protected in place and remain after the construction of the channel. The reach will have an average channel depth of 11 feet. The invert slope will be streamlined requiring excavation and removal of 0 to 1 foot of streambed. Rip rap toe protection will be provided along the proposed channel walls. Immediately downstream of the Mason Street Bridge fish baffle (consisting of cluster of boulders) and fish ledges will be provided along the channel walls. The remnants of the acquired properties along the left bank will be planted with native trees and vegetation, creating a habitat expansion zone.

4.38 Demolish and remove the existing patio deck within the right-of-way at the rear of Eladio's Restaurant adjacent to the right bank of Lower Mission Creek next to State Street Bridge will be required.

PLANTING

4.39 The planting is divided into two areas: the Creek banks and the Habitat Expansion Areas. The tree and shrub species selected for these areas, come from a list included in the *Habitat Restoration, Enhancement, Monitoring, and Management Program Applicable to the Areas Adjacent to the Creek Bank* as provided by the City of Santa Barbara to the California Coastal Commission Permit CC-012-09. This planting palette is exclusively made up of native plants that are appropriate to the habitat and region.

Creek Banks

4.40 The Creek banks have 2 height: 1 vertical slope. In order to accommodate trees on the slopes, PVC pipes of varying sizes (up to a maximum of three feet in diameter) will be placed vertically in between the riprap side slope to allow planting of native trees. The trees to be planted in these pipes have been placed sparingly on the 2H: 1V slope. The riprap sideslope will be covered with topsoil and planted with ground cover and shrubs that will help develop the understory of the larger riparian canopy along the creek. The use of erosion control blankets will allow the vegetation to establish. Holes are cut into the blanket, and plants are installed through the holes. The plants chosen are in the drier spectrum of the riparian plant community because they are installed on such a steep slope, allowing only a moderate amount of water to be retained. The plants themselves have attractive blooms, as in the case of sticky monkey flower, California rose and purple sage. Many are evergreen, such as coffeeberry, lemonadeberry and coyote bush. This combination of plants will not only provide habitat, but will be attractive to anyone viewing the area from one of the banks, or from a bridge.

Habitat Expansion Areas

4.41 The five small parcels of open land along Lower Mission Creek are designed to not only expand the corridor of riparian habitat to be planted along the stream banks, but also to provide passive park space for residents. Native trees, primarily western sycamores, cottonwoods, and coast live oak, will be planted in the habitat expansion zones. Native shrubs, such as seacliff buckwheat, deergrass and hummingbird sage, will also be planted. The parcel of land located near Ortega Street, will in part be used for a tot lot. Pathways and benches will be added to enhance this space. Slopes in these areas will be 2H: 1V slope or flatter (3H: 1V in Reach 1A).

IRRIGATION

4.42 Irrigation is essential to the success of this project's planted vegetation survival. Due to preservation of the existing low flow channel, undisturbed vegetation will most likely survive without supplemental irrigation. It should be noted that many native species germinated in the wild have devices to survive on naturally occurring water sources. Some of these native plants develop taproots (trees primarily). Naturally occurring water sources may not suffice for the plants to get established however. Therefore, supplemental irrigation is used. The supplemental irrigation installed for the first two years of this project, will allow these plants to establish and thrive.

4.43 The following irrigation methods will be used:

- Frequent flood pulses in the low flow channel.

- Drip irrigation.
- Overhead Irrigation (spray heads and bubblers).

4.44 Bubblers are a form of low flow overhead irrigation. Bubblers can be used in conjunction with shallow basins created around planting areas. Usually masses of plants are grouped into a bubbler basin to allow for infiltration of the water applied. Though bubblers are a little less efficient than drip regarding evaporation, they are better at irrigating without salt build up at the plant base. Bubblers are also less conducive to product failure than most other forms of irrigation.

4.45 This project will have multiple planting schemes; thus, more than one irrigation system may be required for purposes of efficiency as well as cost.

SET ASIDE NURSERY HOLDING AREA FOR PLANTS

4.46 During plans and specifications, consideration will be given to establishing a separate nursery holding area for new and salvaged plants. This area will likely be one of the five areas along Mission Creek, until the end of the project, when this area is planted as well.

PREPARATION OF SOIL PRIOR TO PLANTING

4.47 During the construction phase, the existing soil will be evaluated with agronomic soils tests to support the landscaping and mitigation plantings. Required soil amendments will be recommended and the need for soil importation or stockpiling will be determined.

STOCKPILING OF TOPSOIL

4.48 In the event that stockpiling of existing soil is necessary, a location will be provided for the temporary placement of this material, in the construction phase.

MATERIAL REQUIRED FOR CONSTRUCTION

4.49 Material required for project construction will include earthfill material; concrete for walls, footings, and box culvert; rocks/riprap for slope protection; steel reinforcement for concrete support; filter material; fencing material; top soils; planters; and material to establish vegetation. Except for the rocks/riprap, most of the material will be obtained from a distance of about 5 to 10 mile-radius from the project area. Riprap may be obtained from existing quarries located within 50 miles.

HAZARDOUS AND TOXIC MATERIALS AND WASTE

4.50 Three sites of interest have been identified and considered serious existing situations by the California RWQCB. These involve properties at 324 De la Vina Street (Caltrans site), 15 Mason Street and 220 West Gutierrez Street.

4.51 The De la Vina Property abuts Lower Mission Creek north of the US 101. This property was formerly occupied by a dry cleaning business that used perchlorethylene (PCE) in their dry cleaning process. Caltrans obtained title of the property via land acquisition during the widening of US 101. Between 1988 and 1992, soil and groundwater assessment activities conducted at the site by Caltrans confirmed the presence of PCE-affected soil and groundwater at the site. According to quarterly groundwater monitoring reports, Caltrans reportedly remediated on-site soil that contained PCE concentrations greater than 1,000 micrograms per kilogram (µg/kg). In addition, groundwater samples collected by Caltrans from three monitoring wells installed at the site indicate that groundwater contains concentrations of trichloroethene (TCE), acetone, toluene, and xylenes. Based on groundwater elevations collected during previous assessment activities at the site, it was determined that the groundwater flows in the direction from west to east toward Lower Mission Creek.

4.52 The West Gutierrez Property is located approximately 0.13 miles of the De la Vina property in a generally upgradient direction with respect to shallow groundwater flow. Based on the information in the 2000 Phase 1 ESA, this site reportedly contained a large aboveground storage tank (AST) that was used for storage of PCE. This tank is reported by the RWQCB to have leaked over a period of several years resulting in severe contamination of the shallow groundwater aquifer in the area. According the 2000 EIR/EIS, the attorneys representing the property owner of this site are attempting to involve Caltrans in sharing the cost of remediation; the threat of litigation has delayed groundwater remediation at the Caltrans site.

4.53 The 15 Mason Street site contains petroleum soil contamination has been found in the area of the left bank and a plume of contamination appears to extend under the building at 15 Mason Street. This building is scheduled to be demolished and removed as part of this project to make way for the new channel. The areal limits and depths of contamination in this area must be determined after this building has been removed. This investigation and cleanup can be done before construction is begun or suitable arrangements can be made with the construction contractor to remove, replace if necessary and dispose of the contaminated materials.

4.54 Based upon data collected during a Phase II assessment in 2005, it was determined that it that impacted soils that will require mitigation could be encountered during the planned excavation and construction activities. If impacted soils are encountered during construction, an assessment should be made as to the source, nature, and extent of impacts. If soil impacts are deemed to be minimal, the impacted soils will be excavated and temporarily contained in roll-off bins or stockpiled pending profiling of the material and acceptance at a disposal or treatment facility. If characterized as non-hazardous, the soils could potentially be transported for treatment and recycling or disposed of at a local landfill.

4.55 Based on concentrations of volatile organic compounds (VOCs) detected in groundwater during the Phase II assessment, it is likely that VOCs (i.e., PCE and TCE) will be encountered in the lower reaches of Mission Creek during the construction. The RWQCB has recommended that a *General Permit for Discharges of Highly Treated Groundwater to Surface Water, WDR Order No. 01-134 NPDES No. CAG993002* be obtained for the construction dewatering activities and discharge to the Lower Mission Creek (Geomatrix 2005).

4.56 Based on the permit requirements, a conceptual treatment system for managing the dewatering discharge was selected to prepare a preliminary order-of-magnitude cost estimate (Geomatrix 2005). The range of costs for installation and startup of a treatment system may range from $415,000 to $525,000. Monthly O&M costs may range from $34,600 to $44,400.

5. HYDROLOGIC AND HYDRAULIC BASIS FOR DESIGN

5.1 This section describes the hydrologic, hydraulic, and sedimentation analyses that were conducted to support the design of the Lower Mission Creek Project. The analyses described here include rainfall-runoff modeling for the with-project conditions, numerical sedimentation analysis, and a physical hydraulic and sediment model of the baseline and with-project conditions. Detailed descriptions of the assumptions, inputs, methodologies, and results of these studies are provided in Appendix A, Hydraulics and Sedimentation Study Report.

5.2 The characteristics of the existing watershed were assumed to remain the same as assumed in the Hydrology Appendix completed by the Corps in 1999 for the Lower Mission Creek Flood Control Feasibility Study. Based on this assumption, the peak discharges and hydrographs for the various return period events were adopted for this report. Detailed explanation of the area hydrology can be found in the Appendix A, Hydrology, of the feasibility report (Corps 1999). The peak discharges and return periods are provided in Table 5.1 below.

Table 5-1 Peak Discharge

Return Period (year)						
2	5	10	25	50	100	500
Peak Discharges (cfs)						
640	1,500	2,400	3,800	5,500	7,500	13,600

5.3 The design peak discharge of 3,400 cfs, which has a return period of approximately 20 years, was used for both the hydraulic and sediment transport analyses. The modeled water surface elevation (WSE) profile along the project for the design peak discharge is contained within the existing or proposed top of bank elevations along the entire length of the project reach. The design discharge of 3,400 cfs, was determined to be the approximate capacity of the existing State Street Bridge. In the feasibility and alternatives analysis it was decide that the replacement of the State Street Bridge was undesirable due to the added cost and the recent improvements already performed.

5.4 The HEC-GeoRAS program (version 4.2.93 for ArcGIS 9.3) was used to develop georeferenced stream station lines, cross section alignments and cross section profiles. The cross sections profiles were cut using the electronic three-dimensional surface for the portion of the reach from upstream of U.S. Highway 101 to downstream of Castillo Street. The proposed condition geometries downstream of U.S. Highway 101 and upstream of Castillo Street were modeled based on multiple sets of construction plans (both electronic and hardcopies) at different design stages. The existing condition geometry was based mostly on the HEC-RAS model developed by the USACE and provided to Tetra Tech on June 15, 2010, and the HEC-6T sediment transport model from the USACE (2000).

5.5 Results from the sediment-transport model show that most of the modeled reach is moderately to significantly aggradational over the design hydrograph, with most of the aggradation occurring during the falling limb. At the time of the peak discharge, aggradation

depth is generally less than 2 feet, with up to 3 feet of degradation occurring at the most constricted areas. The largest amount of aggradation (up to 4.5 feet) occurs in the reach below the Castillo Street Bridge. The remainder of the reach above the bypass weir is moderately aggradational, with about 1 foot of deposition through most of the reach. More significant aggradation (about 2 feet) occurs in the upstream portion of the oxbow channel, while very little change occurs along the concrete-line portion of the reach. Downstream from the confluence with the bypass channel, less than 1.5 feet of aggradation occurs along most of the reach, except in the downstream estuary, where nearly 3 feet of aggradation occurs. Essentially, the upstream sediment load is trapped in the estuary; hence, there is little sediment delivery to the ocean.

5.6 An R&U analysis was performed using the HEC-FDA program to assess the uncertainty in the existing and proposed top-of-bank elevations. This analysis indicates the elevations will provide approximately 60.05% to 91.74% of Conditional Non-exceedance Probability (CNP) for the design discharge of 3,400 cfs. Currently, there are no minimum CNP requirements for channels, especially with the unique design criteria associated with the Lower Mission Creek. The above results only provide a benchmark to the reliability of the proposed design and thus an increase in wall or bank heights of the current channel design would only be warranted to provide the higher CNP values. At this time there is no expected change in bank elevations.

5.7 The channel improvement includes placement of riprap revetment on the sideslopes of the channel in order to protect the footing/foundation of the soldier pile walls in the event of channel scour and degradation. The determination of riprap sizing and its gradation was performed using the Chanlpro software, developed by the USACE based on the USACE EM 1110-2-1601. The calculation was performed for each subreaches between bridges. The riprap sizing was based on the hydraulic parameters of the Lower Mission Creek up to the 25-years and 50-year return periods. These flood frequencies, which are higher than the design discharge of 3,400 cfs, were selected because, depending on the subreaches, they represent the extreme cases where the water surface elevation in the channel is almost equal to the top of the channel bank or wall elevations. For the design of riprap placement, D_{100} of 18 inches would cover the most severe erosive conditions of the channel and was selected to be applied to the entire project limits

5.8 The toedown elevation of the Lower Mission Creek riprap revetment was designed based on the total scour depth, calculated along the stream bed. The total scour depth was computed as the sum of long-term scour, general scour, bed-form depth, low-flow thalweg incisement, local scour, and bend scour. The scour analysis was conducted for both the design discharge of 3,400 cfs and 50-year discharge of 5,500 cfs. The 50-year discharge was considered in addition to the design discharge because it resulted in top of bank water surface elevations for most of the cross sections, although the flow breaks out of the channel in some areas

5.9 Based on the analysis, the uniform scour depth of six (6) feet was used as a toedown depth of the riprap revetment, measured from the bottom of the low flow pilot channel. The areas, located immediately upstream and downstream of some of bridges, where the total scour potential is deeper than the project scour depth, it was decided to construct a hard-bottom channel section where the flat riprap placement replaces a soft-bottom and riprap toedowns

6. GEOTECHNICAL BASIS FOR DESIGN

GEOLOGIC SETTING

6.1 The Lower Mission Creek project is located within the Western Transverse Ranges physiographic province of southern California. The Transverse Ranges are a complex series of east-west trending mountain ranges and valleys. The structural orientation of this province is transverse to the general north-northwest structural trend of other geologic provinces in California. The Western Transverse Ranges extend from the Los Angeles Basin westward to Point Arguello, near Lompoc, California, and is dominated by the east-west trending Santa Ynez Mountain Range. Cretaceous-Cenozoic sedimentary marine rocks and Miocene volcanic rocks dominate the Western Transverse Ranges region.

6.2 The project alignment is located within an elevated portion of the Santa Barbara coastal plain characterized by a gently undulating, generally south-sloping ground surface. Locally, the project alignment is underlain by Quaternary-aged alluvium over the south-dipping homoclinal structure of the Santa Ynez Mountains. Man-made fills, associated with previous channel, bridge and other construction overlie the alluvial soils. More detailed descriptions of local subsurface conditions for the various channel reaches are provided in subsequent sections.

SEISMICITY

6.3 The project alignment is not located within any earthquake fault zones (EFZ) identified by the California Geological Survey (CGS). The project site, however, is located within a seismically active region of Southern California. The nearest known fault is the Mesa-Rincon Creek (MRC) fault, which is located approximately 0.1 km south-southwest of the downstream end the project alignment. This fault, however, is not currently considered a seismic hazard source by either the U.S. Geological Survey (USGS) or the CGS. Nearby faults that are considered active, and were considered in the evaluation of potential ground motion, include the North Channel Slope Fault, the More Ranch-Mission Ridge-Arroyo Parida Fault, and the Santa Ynez Fault (east & west segments).

6.4 The methodology for evaluation of potential ground motions and seismic hazards along the LMC alignment varied between the geotechnical consultants for particular reaches. Bengal Engineering Inc. (Bengal) provided seismic parameters for Reaches 1B, 2A and 3 through 7 and generally followed Corps criteria. Fugro West. Inc. (Fugro) provided seismic parameters for Reaches 1A and 2B and generally followed California Building Code (CBC) criteria. One of the main differences in the methodology is that the Corps criteria establishes design level motions for Operational Basis Earthquake (OBE) and Maximum Design Earthquake (MDE) while the CBC criteria is based on the Maximum Considered Earthquake (MCE) with reduction factors for evaluating various seismic conditions (i.e. liquefaction potential, seismic earth pressures). A comparison of the range of seismic parameters presented by the two consultants is presented below. More detail on specific design parameters and estimated settlement/deformations for each channel reach is presented in subsequent sections.

Table 6.1 Comparison of Seismic Parameters

Consultant	Bengal Engineering Inc Corps criteria		Fugro West Inc. CBC criteria
Design Basis	Operating Basis Earthquake - OBE (144 year return period)	Maximum Design Earthquake - MDE (975 year return period)	Maximum Considered Earthquake – MCE (~2475 year return period)
Design Peak Ground Acceleration for Liquefaction Analysis (not magnitude corrected)	0.3g	0.7g	0.66g - 0.67g (taken as 2/3 x MCE value)
K_H value used for seismic earth pressure analysis	0.2	0.23 – 0.47	0.29 – 0.34
Seismic Earth Force (lb/ft) based on wall height H	$9.4H^2 – 10.6H^2$	$14.4H^2 – 53.1H^2$	$16H^2 – 18H^2$

6.5 The comparison shows that the Corps MDE design event provides the most conservative parameters for soil liquefaction and seismic earth pressures.

6.6 The potential for soil liquefaction and lateral spreading was found to be high for the Corps MDE and the CBC design events. It was recognized that the liquefaction and lateral spreading risk appears to be a regional hazard and not just associated with the LMC channel. Although the proposed channel wall improvements will marginally improve the factor of safety for lateral instability due to liquefaction, complete mitigation of the risk of soil liquefaction and resultant lateral spreading would certainly be a cost prohibitive and may likely be technically unachievable within the channel right-of-way restrictions.

6.7 The seismic earth pressures for both the Corps OBE and CBC design criteria result in some wall movement but can be tolerated with a robust structural design. However, resisting the potential seismic earth pressures from the MDE would be a very costly design. Even if designed for MDE level seismic earth pressures, channel walls would still be severely compromised given that the MDE event will likely cause regional liquefaction and lateral ground deformation on the order of several feet.

6.8 The estimated seismically induced lateral earth pressures presented in Table 6.1 for k_h=0.47 results in excessively design constraints and anticipated costs for the proposed retaining walls. In such cases, as per EM 1110-2-2502, it should be preferable to accept some small wall displacement during design seismic event. This will result in a more economical wall design since a lower k_h value can be used for structural design. Based on the NCHRP Report 611 (NCHRP, 2008), it is estimated that lateral displacement of retaining walls designed with a k_h value equal to one-third of the EPGA should be less than four (4) inches at the subject project site. Therefore, it is our opinion that retaining walls for the subject project may be designed with k_h= 0.23 (=1/3 x 0.7). This is further discussed in the Bengal 2011 report and **Table 6.21**.

REACH 1A

General

6.9 Geotechnical evaluation of Reach 1A was performed by Fugro West Inc. as summarized in the report entitled "Geotechnical Engineering Report , Lower Mission Creek Channel Improvements, Mason Street to State Street, Santa Barbara, California" draft version dated March 2009. The Prime Design Engineer for this reach is Dean Ryan Consultants & Designers.

Subsurface Investigation

6.10 Project specific exploration within this reach included three mud rotary borings drilled to depths of 67 to 101.5 feet and four Cone Penetrometer Test (CPT) soundings to depths of 61 to 86 feet. Additional subsurface information was taken from a previous study performed for the Mason Street Bridge over Lower Mission Creek and from geotechnical studies performed for adjacent private development.

Subsurface Conditions

6.11 The subsurface soils conditions encountered within Reach 1A consisted of 3 to 7 feet of fill material composed of sandy clay and silty sand overlying alluvial deposits. The alluvial soils above a depth of approximately 30 to 40 feet (approximately elevation -20 to -30) generally consisted of medium stiff to stiff clays, silty clays , clayey silts, and silts interbedded with loose to medium dense silty sands and clayey sands. Below a depth of 30 to 40 feet the alluvial sediments generally consisted of medium dense to very dense silty sand and clayey sands interbedded with stiff to very stiff fine grained soils. Groundwater was encountered at a depth varying from 5 to 8 feet below existing grade.

Liquefaction Potential

6.12 Potential soil liquefaction was identified for the loose to medium dense granular soils above a depth of approximately 40 feet below existing grade (approximately elevation -30 feet). Liquefaction-induced ground settlement on the order of 2 to 5 inches was estimated. This liquefaction potential was considered in both the design of channel walls and evaluation of global slope stability.

Wall Type Selection

6.13 Several different channel wall types were evaluated by the design team. These included conventional reinforced concrete cantilever retaining walls, steel H beam soldiers pile walls, vinyl sheet pile walls, and cast-in-place reinforced concrete secant pile walls. The cast-in-place reinforced concrete secant pile wall (secant pile wall) was selected as the most suitable wall type for several reasons including:

- Easily adaptable to the EIR requirements for the channel face
- Installation causes less disturbance to the local area (no pile driving required)
- Structurally capable of withstanding design loads without soils anchors

Slope Stability

6.14 Slope stability analysis of a typical cross-section of the proposed secant pile wall system was performed. The analysis indicated an adequate factor of safety for the static condition and

for post-liquefaction condition. Additional analysis of the secant pile wall system which combined post-liquefaction strengths with a pseudo-static load equal to half of the design peak ground acceleration indicated a factor of safety greater than the pre-existing condition but still less than 1.0. Is was concluded that there was risk of significant lateral deformation of the secant pile wall system as a result of seismic shaking and soil liquefaction. However, it was noted that the mitigation of earthquake induced lateral spreading/deformation was not a requirement of the wall design.

Wall Design Parameters

6.15 Lateral earth pressures were provided for design of the secant wall as summarized below:

Table 6.2 Lateral Earth Pressures

Wall Loading Condition	Lateral Earth Pressure Condition	Equivalent Fluid Pressure
Cantilevered- Drained	Active	42 pcf
Cantilevered- Undrained	Active	20 pcf + hydrostatic water pressure
Restrained/Braced – Drained	At-Rest	65 pcf
Restrained/Braced – Undrained	At-Rest	100 pcf
Passive Resistance - Drained	Passive	350 pcf (ultimate)
Passive Resistance –Undrained or Below Groundwater Level	Passive	175 pcf (ultimate) + hydrostatic water pressure

6.16 In addition, a seismic earth pressure resultant of $18H^2$ lb/lineal foot of wall (where H is the retained earth height in feet) was also provided. The resultant is assumed to act 2/3H above the base of the wall.

6.17 Design parameters for use in computing wall lateral capacity, moments, and deformation utilizing the computer LPILE were also provided as summarized below. Parameters were given for both granular and clayey soil profiles and for soil liquefaction conditions.

Table 6.3 Estimated LPILE Parameters, Fine-Grained Profile

Layer No.	Approx Elev. (ft)	Soil Type	Total Unit Wt. (pcf)	Strength Parameter	LPILE Soil Type	K (psi)	ϵ_{50}	p-, y-multiplier
1	+3 to -7	Lean Clay	125	c=1,000 psf, Φ=0°	Soft Clay	--	0.010	y-mult: 4
2	-7 to -27	Lean Clay	125	c=1,500 psf, Φ=0°	Soft Clay	--	0.010	y-mult: 4
3	-27 to -32	Silty Sand	125	c=0 psf, Φ=35°	API Sand	60	--	p-mult: 0.5 y-mult: 4
4	-32 to -37	Lean Clay	125	c=2,000 psf, Φ=0°	Soft Clay	--	0.007	y-mult: 4
5	-37 to -47	Silty Sand	125	c=0 psf, Φ=35°	API Sand	125	--	p-mult: 0.5 y-mult: 4

Table 6.4 Estimated LPILE Parameters, Course-Grained Profile

Layer No.	Approx Elev. (ft)	Soil Type	Total Unit Wt. (pcf)	Strength Parameter	LPILE Soil Type	K (psi)	ϵ_{50}	p-, y-multiplier
1	+3 to -32	Silty Sand	125	c = 0 psf, Φ = 35°	API Sand	30	--	p-mult: 0.5 y-mult: 4
2	-32 to -38	Lean Clay	125	c = 2,000 psf, Φ=35°	Soft Clay	--	0.007	y-mult: 4
3	-38 to -47	Silty Sand	125	c = 0 psf, Φ = 35°	API Sand	125	--	p-mult: 0.5 y-mult: 4

Table 6.5 Estimated LPILE Parameters, Liquefaction Conditions

Layer No.	Approx Elev. (ft)	Soil Type	Total Unit Wt. (pcf)	Strength Parameter	LPILE Soil Type	K (psi)	ϵ_{50}	p-, y-multiplier
1	+3 to -28	Liquefiable granular soil – model as soft clay	125	c = 450 psf, Φ = 0°	User defined p-y curves	--	--	--
2	-28 to -32	Silty Sand	125	c = 0 psf, Φ = 35°	API Sand	60	--	p-mult: 0.5 y-mult: 4
3	-32 to -38	Lean Clay	125	c = 2,000 psf, Φ = 0°	Soft Clay	--	0.007	y-mult: 4
4	-38 to -47	Silty Sand	125	c = 0 psf, Φ = 35°	API Sand	125	--	p-mult: 0.5 y-mult: 4

Table 6.6 p-y Data Liquefiable Soil Layers

Elevation (ft)	p-y curve data			
+3	p (psf)	0	18	18
	Y (inch)	0	1	20
-4	P (psf)	0	1800	1800
	Y (inch)	0	4	20
-28	P (psf)	0	1800	1800
	Y (inch)	0	8	20

6.18 The following ultimate end-bearing and side friction values were provided for evaluation of the axial capacity of secant pile walls:

Table 6.7 Ultimate End-Bearing and Side Friction Values	
Ultimate Skin Friction Value Above Elevation -20	600 psf
Ultimate Skin Friction Value Below Elevation -20	1250 psf
Ultimate End Bearing Capacity	10,000 psf

REACH 2A

General

6.19 Geotechnical evaluation of Reach 2A was performed by Bengal Engineering Inc. as summarized in the report entitled "Geotechnical Report , Lower Mission Creek Bypass Culvert (Yanonali Street to Union Pacific Railroad in Santa Barbara, California" draft version dated August 2010. The Prime Design Engineer for this reach is Tetra Tech.

Subsurface Investigation

6.20 Geotechnical investigation and for Reach 2A included one Cone Penetrometer Test (CPT) sounding and one mud rotary boring performed by Bengal Engineering Inc. Supplemental geotechnical information from design studies and construction reports for adjacent portions of Lower Mission Creek Channel were also utilized.

Subsurface Conditions

6.21 The subsurface conditions encountered within the exploratory boring consisted of approximately 7 to 8 feet of fill material overlying alluvial deposits. The fill material was composed predominantly of sandy silt with scattered to abundant rock fragments. Deeper fills should be anticipated within this reach, particularly near the existing channel retaining walls and existing Yanonali Street bridge abutments.

6.22 The underlying alluvial soils consisted predominantly of soft to medium still silty clays and sandy clays with some interbedded layers of silty sand to a depth of approximately 32 feet (approximate elevation -15). Below this depth the subsurface conditions consisted of medium dense to very dense sands with some interbedded layers of silty clay.

6.23 Specific groundwater levels were not measured in the boring and CPT advanced within Reach 2B. However, based on nearby geotechnical explorations and construction records from the adjacent culvert under the Union Pacific right-of-way, groundwater is anticipated to be encountered 5 to 10 feet below existing grade (elevation +11.5 to +6.5).

Soil Liquefaction Potential

6.24 Based on their consistency, gradation, and plasticity, the soft to medium stiff fine-grained soils within Reach 2A are considered potentially liquefiable under the design level earthquake event. Potential liquefaction-induced total ground settlement is estimated to be approximately 1 to 3 inches, for the OBE and MDE event, respectively. Potential differential settlement is estimated to be one half of the total settlement value.

Culvert Design Parameters

6.25 Based on the geotechnical conditions within Reach 2A, the following design parameters were recommended:

Table 6.8 Culvert Design Parameters

Backfill / Bedding Condition		Recommended Value
Select Granular Fill	Total Unit Weight (pcf)	135
	Buoyant Unit Weight (pcf)	75
	Effective Friction Angle (degrees)	35
	Effective Cohesion (psf)	0
	Coefficient of Friction Between Soils and Concrete	0.45
	Coefficient of Friction Between Soils and Geotextile	.40
	Active Lateral Earth Pressure Coefficient	.27
	At- Rest Lateral Earth Pressure Coefficient	.43
	Passive Lateral Resistance Coefficient	4.0
Native Soil	Total Unit Weight (pcf)	130
	Buoyant Unit Weight (pcf)	70
	Effective Friction Angle (degrees)	26
	Effective Cohesion (psf)	0
	Coefficient of Friction Between Soils and Concrete	.35
	Coefficient of Friction Between Soils and Geotextile	.3
	Active Lateral Earth Pressure Coefficient	.4
	At- Rest Lateral Earth Pressure Coefficient	.55
	Passive Lateral Resistance Coefficient	2.5
Select Bedding	Coefficient of Friction Between Soils and Concrete	0.6
	Coefficient of Friction Between Soils and Geotextile	0.45

6.26 An allowable bearing capacity of 1500 psf was recommended for static conditions. An ultimate bearing capacity (including loss of strength due to liquefaction) of 2000 psf was recommended for seismic conditions.

Corrosion Potential

6.27 Testing of soil samples did not indicate severe soil corrosion potential for metal or concrete. However, given the proximity of this project to the ocean, the concrete design and reinforcement type and cover should consider the marine atmosphere condition.

Construction Conditions

6.28 Due to the presence of soft clayey soils and high groundwater conditions, it is anticipated that some form of subgrade stabilization will be required prior to placing bedding material for the culvert. Stabilization may require placement of a layer of 1 ½ inch size rock material and/or use of a geotextile or filter fabric.

REACH 2B

General

6.29 Geotechnical evaluation and recommendations for Reach 2B were provided by Fugro West Inc. as summarized in the report entitled "Geotechnical Engineering Report, Lower

Mission Creek Channel Improvements, Santa Barbara, California" draft version dated January 2009. The Prime Design Engineer for this reach is HDR Engineering Inc. Supplemental geotechnical data was taken from borings performed by K-C Geotechnical Associates for the Santa Barbara Railroad Station Development Project (1986), and from the Caltrans Log of Test Borings for the Highway 101 bridge crossing of the existing Mission Creek (Bridge No. 51-277R/L) and the backfilled future Mission Creek overflow channel (Bridge No. 51-298R/L).

6.30 Reach 2B consists of the upstream portion of the proposed overflow bypass for Lower Mission Creek. The reach extends from the weir/inlet structure at the main channel downstream to an existing RCB structure at the UPRR right-of-way.

Subsurface Investigation

6.31 The geotechnical exploration performed by Fugro consisted of three hollow stem auger borings drilled to depths varying from 30.5 to 44 feet below existing grade and four Cone Penetrometer Test (CPT) soundings extending 54 to 74 feet below existing grade. Logs for four borings drilled by K-C Geotechnical (depths varying from 10 to 32.5 feet), as well as six mud rotary borings (approximately 55 to 72 feet), two penetration borings (approximately 60 feet) and one shallow sampler boring performed by Caltrans were also reviewed.

Subsurface Conditions

6.32 Fill soils, composed of clayey sands and silty sands, were encountered within the Fugro borings to depths varying from approximately 4.5 to 6 feet. The underlying alluvial soils generally consisted of soft to medium stiff fine grained soils (lean clay and sandy clay) inter-bedded with loose to medium dense clayey and silty sands extending approximately 25 to 30 feet below existing grade. Below this depth the alluvial deposits generally consisted of inter-bedded layers of medium dense to dense silty sand, loose to medium dense silt, and stiff lean clay.
Groundwater was noted within the Fugro borings and CPT's at depths varying from 9 to 15 feet below existing at the time of exploration. Readings taken within standpipes installed in two of the borings showed groundwater depths of 9.5 and 10.5 feet below existing grade more than two months after drilling. To account for future fluctuations in the groundwater level, an assumed groundwater depth of 8 feet was used in liquefaction and foundation analysis.

Liquefaction Potential

6.33 Liquefaction analysis indicated that the loose to medium dense sands extending to a depth of approximately 50 feet below existing grade have significant liquefaction potential. The estimated potential liquefaction-induced settlement ranged from approximately 2 to 4 inches. The potential for lateral spreading due to liquefaction was also identified. The amount of potential movement resulting from lateral spreading was estimated to be on the order of 3 feet and possibly greater. Complete mitigation of lateral spreading potential was considered probably not feasible given the spatial constraints of the project as well as economic considerations. However, is was recommended that the potential ground motion due to liquefaction-induced settlement /lateral spreading be considered in the selection and structural design of channel walls and foundations.

Channel Type Selection

6.34 The design for Lower Mission Creek Channel within Reach 2B will utilize several channel sections. The project upstream of Highway 101 will consist of a weir/inlet structure. This construction will require retaining walls up to approximately 17 feet in height and may utilize either conventional cantilever retaining wall supported on shallow foundations or possibly top-down constructed soldier pile or sheet pile walls. Beneath Highway 101 the channel design will be a double box culvert structure which will utilize the existing highway bridge abutments as the culvert walls and add a concrete mat foundation and a mid-line divider wall. Between Highway 101 and Montecito Street the channel will be designed as a U-Shape open channel with a divider wall. The downstream portion of Reach 2B, from Montecito Street through the existing City of Santa Barbara Moreton Bay Fig Tree Park and Railroad Depot parking lot, will be designed as double RCB and will be installed using a cut and cover technique.

Foundation Design Parameters

6.35 Foundation parameters were provided for design of shallow foundations for retaining walls, channel walls and RCB structures. The parameters were based on recommended over-excavation of soft soils below foundation elevation a minimum depth of 2 to 2.5 feet and stabilization of the excavated surface with the use of filter fabrics, crushed rock and/or geotextiles.

6.36 The following design parameters were presented for culvert design:

Table 6.9 Culvert Design Parameters

Allowable Bearing Pressure	2,000 psf
Estimated Static Settlement	Total 0.5 – 1.5 inch Differential 0.75 inch / 30 feet
Lateral Earth Pressure	80 psf/foot of depth (drained) 100 psf/foot of depth (undrained)
Lateral Surcharge Loading	0.5 x vertical pressure
Ultimate Base Friction Coefficient	0.35
Ultimate Passive Pressure Resistance	300 psf/ foot of depth (above groundwater) 150 psf/ foot of depth (below groundwater)
Skin Friction Resistance to Uplift	30 psf/ foot of depth (above groundwater) 15 psf / foot of depth (below groundwater)
Unit Weight to Resist Uplift	125 pcf (above groundwater) 65 pcf (below groundwater)

6.37 The following design parameters were presented for retaining wall /open channel wall design:

Table 6.10 Retaining Wall/Open Channel Wall Design Parameters	
Allowable Bearing Pressure	1,750 psf (footing isolated from invert slab; width > 12') 2,000 psf (footing tie structurally to invert slab; width > 25')
Estimated Static Settlement	Total 2 - 3 inch Differential 0.75 inch / 30 feet
Lateral Earth Pressure	40 psf/foot of depth (drained) 85 psf/foot of depth (undrained)
Lateral Surcharge Loading	0.33 x vertical pressure
Ultimate Base Friction Coefficient	0.35
Ultimate Passive Pressure Resistance	300 psf/ foot of depth (above groundwater) 150 psf/ foot of depth (below groundwater)
Dynamic Earth Force (seismic)	$16H^2$ lbs/lineal foot of wall (H= retained height in feet, force acting 2/3 H from base of wall)
Unit Weight to Resist Uplift	125 pcf (above groundwater) 65 pcf (below groundwater)

Corrosion

6.38 Testing of soil samples did not indicate severe soil corrosion potential for metal or concrete.

REACHES 1A, 3-7

General

6.39 Bengal Engineering, Inc., of Goleta, California, conducted a site-specific geotechnical exploration for the subject project. Results of this site exploration were presented in a report titled "Geotechnical Design Report for the Lower Mission Creek Channel Improvement Project –Phase 2 (Reaches 1B and 3-7), Santa Barbara, California," dated July 12, 2011. For the purposes of the referenced report, the project alignment was broken up into Segment I (Station 17+00 to 38+00) and Segment II (Station 38+00 to 61+50).

6.40 This part of the subject report presents the geotechnical basis of design for the subject project based on the findings and recommendations presented in the geotechnical report, referred hereafter as the Bengal Engineering (2011) report.

Site Exploration

6.41 The project-specific site exploration program conducted by Bengal Engineering (2011) included a site reconnaissance visit, collection and review of pertinent and available existing literature, a field subsurface exploration and laboratory testing. The scope of the field and laboratory investigations were developed based on the requirements of the proposed improvements as shown on the preliminary design plans, and communications with the project design team members during the course of the planning and execution of the geotechnical investigation program. Subsurface information from the existing literature reviewed was also considered in the development of both the field exploration and the laboratory testing programs.

6.42 The field exploration program consisted of four (4) Cone Penetration Tests (CPT) and four (4) mud rotary borings. The CPT soundings were advanced to a depth of about 80 feet and the borings were drilled to depths ranging from about 56 to 81 feet below existing ground

surface. Standard Penetration Test (SPT) blow counts were measured at selected depths within the borings during drilling. Relatively undisturbed samples of the site subsurface soils were collected from selected depths of the borings using the Modified California Sampler. Disturbed samples were collected using the SPT sampler.

6.43 The subsurface soil types and conditions encountered during the drilling of the borings were observed and logged by a geologist. Selected samples of the site soils were tested in the laboratory to verify and update, when necessary, field descriptions and to evaluate necessary soil engineering parameters for the analysis and design of the proposed improvements. The geotechnical laboratory testing program included soil moisture content and dry density tests, gradation analysis, passing No. 200 sieve, laboratory vane and direct shear tests, consolidation tests, R-value and chemical or corrosivity tests.

6.44 The available existing geotechnical field exploration and laboratory testing results were also reviewed and evaluated to supplement the field and laboratory testing data collected in the course of the current exploration, and used in the preparation of the geotechnical design report.

Subsurface Conditions

Groundwater Conditions

6.45 Data on the groundwater depths encountered during the times of various site explorations within the project limits are provided in Bengal Engineering (2011) report. Based on this data, the depth to groundwater for the usual or normal service conditions may be taken as 5 to 15 feet below the existing ground surface.

Soil Conditions

6.46 Based on the site exploration conducted by Bengal Engineering, subsurface conditions along the project alignment are variable and complex. The soil profile along the project alignment consists mainly of interbedded thin layers of alluvial soils. At some locations along the creek banks the alluvial soils are overlain by earth fill soils associated with past constructions. Soils along the alignment comprise mainly of low plasticity silts (ML), silty clay (CL-ML), silty sand (SM), sand (SP) and some lean clay (CL) and clayey sand (SC). Traces of gravel or pebbles were encountered at some isolated depths and locations within the borings.

6.47 Up to twelve feet (12') of earth fill was encountered in the exploratory borings. Old concrete roadway, of variable thickness and unknown extent, was found underlying the asphalt concrete surface at several locations. The deeper fill areas encountered during our subsurface exploration were located behind the existing bridge abutments along the alignment.

6.48 Except some localized earth fill as discussed above, the project alignment to the maximum depths explored is underlain by layered alluvial deposits. The thickness of the interbedded soil layers varies from a few inches to more than a few feet, with highly variable distribution along the alignment. The soil types, within the categories listed above, fine contents and the layer transition characteristics, and their relative spatial distributions, are highly variable in both the vertical and horizontal directions.

6.49 The SPT test performed at one location within the bridge abutment fill indicated a blow count of 13. This indicates medium dense soil conditions at the location tested. Highly variable composition and density conditions should be anticipated for the fills.

6.50 The alluvium extending to a depth of about 40 to 50 feet consists of interbedded layers fine-grained and coarse-grained soils. The Plasticity Index (PI) of the fine-grained soil samples tested in the laboratory ranged mainly from 3 to 9, with the majority falling within the range of 3 to 6. The fines content of the site soils generally ranges from about 10 percent and 90 percent. The fine-grained soils are classified mainly as low plasticity silts (ML), silty clay (CL-ML) and some lean clay (CL). The measured SPT blow counts of these low plasticity fine-grained soils ranged mainly from 5 to 9, indicating loose to medium dense conditions. The consistency of the fine-grained site soils that can be classified as silty clay (CL-ML) and clay (CL) is generally soft to medium stiff within this depth. The SPT blow counts of the deeper layers of fine-grained cohesive soils ranged from 13 to 18, indicating stiff consistency.

6.51 The extent as well as the layer thickness of the interbedded coarse-grained soils (SP and SM), generally increase with depth. The SPT blow counts for these soils present within the upper 40 50 feet ranged mainly from 10 to 24, indicating medium dense conditions. The measured SPT blow counts for the underlying coarse-grained soils ranged mainly from about 30 to 62, corresponding to dense to very dense conditions.

6.52 The effective cohesion (c') and friction angle (Ø') of the fine-grained soils tested ranged mostly from 0 to about 300 psf and 23 to 33 degrees, respectively. The majority of the fine-grained soils exhibited an effective cohesion of zero and an effective friction angle ranging from 25 to 30 degrees. The coarse-grained soils at site exhibited zero to 300 psf effective cohesion and 30 to 40 degrees effective friction angle, with the majority exhibiting effective friction angles within the range of 33 to 36 degrees.

6.53 The one dimensional compression index of (C_c) of the samples tested ranged from about 0.05 to about 0.1. Based on the measured liquid limits, Cc for the fine-grained clayey soils at the site is expected to range from about 0.1 to 0.2. The in-situ soil permeability as well the rate of groundwater flow or discharge to excavations should be expected to vary significantly from location to location depending on many factors including the soil types and fines content, the relative distribution and thickness of the soils layer, the depth of excavation and the stability conditions maintained during construction. The horizontal permeability of the individual soil layers is estimated to range from mostly from 10-3 to 10-6 cm/sec. Site soils are not considered prone to collapse or swelling due to wetting.

Seismic Hazards

Fault Rupture Hazards

6.54 The project site is not located within any earthquake fault zones (EFZ) identified by the California Geological Survey (CGS). The project site, however, is located within a seismically active region of Southern California. The nearest known fault is the Mesa-Rincon Creek (MRC) fault, which is located approximately 0.1 km south-southwest of the project alignment. This fault, however, is not currently considered a source of seismic hazard by both the U.S.

Geological Survey (USGS) and the CGS. Therefore, the project alignment is not considered susceptible to fault ground surface rupture hazard.

Ground Motion Hazards

6.55 Based on a site-specific Probabilistic Seismic Hazard Analysis (PSHA), the Effective Peak Ground Acceleration (EPGA) was estimated to be about 0.3g and 0.7g for the initial or non-liquefied site conditions for the Operational Basis Earthquake (OBE) and Maximum Design Earthquake (MDE) as defined in the EM 1110-2-2100 and other pertinent current Corps publications. The moment magnitudes of the modal earthquakes associated with the OBE and MDE were found to be 6.6 and 7.2, respectively

Liquefaction and Other Secondary Seismic Hazards

6.56 Based on the geotechnical analyses, the project alignment is underlain by potentially liquefiable soils. The liquefaction potential and extent of liquefaction vary along the alignment and depend on the design earthquake event (i.e., OBE or MDE). Overall, the liquefaction hazard is considered very low to high for the OBE event and moderate to high for the MDE event. Liquefaction analysis indicated that EPGA during the MDE event should be limited to about 0.4g due to the liquefaction of the subsurface soils during the early phase of ground shaking. Liquefaction-induced ground surface settlement is estimated to be on the order of one (1) to six (6) inches. Relevant soil liquefaction effects, e.g., reduction in the axial and lateral support capacities of foundations, and stability of slopes were also evaluated and presented in the following sections.

Design Soil Profiles and Engineering Parameters

6.57 Geotechnical data evaluation and interpretation were performed to establish relevant soil engineering parameters and groundwater conditions for the static and seismic geotechnical, geo-structural and structural analysis and design of the proposed improvements. Generalized soil profiles with relevant soil engineering parameters were developed for both static and seismic analysis.

Design Groundwater Conditions

6.58 For the normal operating conditions, we recommend using a groundwater depth of 5 feet for Segment I (Station 17+00 to 38+00) and 10 to 15 feet for Segment II (Station 38+00 to 61+50). Depth of free water in the creek may be taken as 2 feet for the majority of time during the year.

6.59 We recommend that for both OBE and MDE events, groundwater and creek water levels be taken the same as the normal operating conditions recommended above. For the flooding load conditions, groundwater level behind the walls may be taken at the design flood water level in the creek.

Soil Profiles and Properties for Static Design

6.60 The generalized soil profiles and recommended parameters for static design are presented in Tables 6.11 and Table 6.12.

Table 6.11 Generalized Soil Profile and Parameters[(a)] for Segment I (Sta. 17+00 to 38+00)

Layer No.	Approx Depth below O.G. (ft)	Generalized Soil Description	Total Unit Wt. γ_t (pcf)	Shear Strength Parameter[(b)]	Parameters for p-y curves		
					LPILE Soil Type [(c)]	K (lb/in^3)	ε_{50}
1	0-5.0	Silty Sand/Sandy Silt (SM/ML), medium dense, moist	125	c'=0.0 ksf, ϕ'=30°	1	60	-
2	5.0-11.0	Silty Sand/Sandy Silt (SM/ML), medium dense, moist to wet	125	c'=0.0 ksf, ϕ'=30°	2	40	-
3	11.0 - 16.0	Silt/Silty Clay (ML/CL-ML), medium dense/medium stiff, wet	125	c'=0 ksf, ϕ'=30°	2	40	-
4	16.0-21.5	Silty Sand/Sandy Silt (SM/ML), medium dense, wet	125	c'= 0.0 ksf, ϕ=33°	2	60	-
5	21.5-26.5	Silt/Silty Clay (ML/CL-ML), medium dense/medium stiff, wet	125	c'=0.0 ksf, ϕ'=28°	2	30	-
6	26.5-30.0	Sand/Silty Sand (SP/SM), medium dense, wet	125	c'=0.0 ksf, ϕ'=35°	2	100	-
7	30.0-42.0	Silt/Silty Clay (ML/CL-ML), medium dense/stiff, wet	125	c'=0.0 ksf, ϕ'=30°	2	40	-
8	42.0-65.0	Sand/Silty Sand (SP/SM), dense, wet	130	c'=0.0 ksf, ϕ'=36°	2	125	-

Notes:
(a) For long-term and sustained loading or drained soil resistance analysis only.
(b) c' = Effective cohesion and ϕ'= Effective angle of friction
(c) Reference: Ensoft (2009), 1-Reese sand above water table, 2- Reese sand below water table

Table 6.12 Generalized Soil Profile and Parameters[(a)] for Segment II (Sta. 38+00 to 61+50)

Layer No.	Approx Depth below O.G. (ft)	Generalized Soil Description	Total Unit Wt. γ_t (pcf)	Shear Strength Parameters [(b)]	Parameters for p-y curves[c]		
					LPILE Soil Type[c]	K (lb/in^3)	ε_{50}
1	0.0-10.0	Silt/Silty Clay/Clay (ML/CL-ML/CL), loose to medium dense/soft to medium stiff, moist	125	c'=0.0 ksf, ϕ'=25°	1	25	-
2	10.0 - 20.0	Silt/Silty Clay/Clay (ML/CL-ML/CL), loose to medium dense/soft to medium stiff, wet	125	c'=0.0 ksf, ϕ'=25°	2	25	-
3	20.0-25.0	Silt/Silty Clay (ML/CL-ML/CL), to medium dense/soft to medium stiff, wet	125	c'=0.0 ksf, ϕ'=25°	2	40	-
4	25.0-31.0	Sand (SP), medium dense, wet	125	c'= 0.0 ksf, ϕ=35°	2	60	-
5	31.0-38.0	Silty Clay (CL), Stiff to Hard	125	c'=0.0 ksf, ϕ'=25°	2	40	-
6	38.0-42.0	Silty Sand/Sandy Silt (SM/ML), medium dense, wet	125	c'=0.0 ksf, ϕ'=35°	2	60	-
7	42.0 – 50.0	Clay (CL), hard to very hard	130	c'=0.0 ksf, ϕ'=25°	2	50	-
8	50.0-60.0	Sand/Silty Sand (SP/SM)), dense to very dense	130	c'=0.0 ksf, ϕ'=40°	2	150	-

Notes:
(a) For long-term, sustained static loading or drained soil resistance analysis only
(b) c' = Effective cohesion and ϕ'= Effective angle of friction
(c) Reference: Ensoft (2009), 1-Reese sand above water table, 2- Reese sand below water table

Ground Motion, and Soil Profiles and Properties for Seismic Design

6.61 Seismic ground motion and soils design parameters were developed and recommended for three conditions; namely, (1) Non-liquefaction, (2) initial liquefaction and (3) post-complete liquefaction. These parameters are presented in the following sections.

Design Ground Motion

6.62 The recommended Effective Peak Ground Acceleration (EPGA) for the initial or non-liquefied and liquefied site conditions are presented in the table below.

Table 6.13 Recommended Design Ground Motion					
Design Seismic Event	Return Period (years)	Site Conditions			
		Non-Liquefiable (or Initial, V_{s30}= 244 m/sec)		Liquefied	
		EPGA (g)	M_{mode}	EPGA (g)	M_{mode}
OBE	144	0.3	6.6	0.3	6.6
MDE	950	0.7	7.2	0.4	7.2

Soil Parameters

6.63 Based on the results of our site-specific seismic hazard analysis, we recommend that seismic evaluation and design be based on analysis performed for the following three loading or demand and resistance cases and by considering appropriate seismic soil-structure interactions.

Case 1 - No-Liquefaction

6.64 This case is to ensure that the seismic demand on the designed features will not exceed the available resistance in the event the site soils along the alignment do not experience liquefaction as predicted. Design ground parameters and soil resistance conditions for this design are presented in the table below.

Table 6.14 Recommended Design Ground Motion and Soil Parameters for Case 1 – No-Liquefaction					
Design Seismic Event	Return Period (years)	Design Ground Motion			Design Soil Resistance Parameters
		EPGA(g)	Design k_h [(a)]	M [(b)]	
OBE	144	0.3 [(c)]	0.20	6.6	r_u =0.0 [(d, e)]
MDE	950	0.7	0.47	7.2	r_u =0.0 [(d, e)]

Notes:
(a) k_h= (2/3) (EPGA =Coefficient of the Design Peak Ground Acceleration as per EM 1110-2-2100).
(b) M = Moment Magnitude of the Modal Earthquake
(c) This analysis is not necessary for Segment I (Station 17+00 to 38+00).
(d) r_u = Excess pore water pressure ratio = (Excess pore water pressure/Initial effective overburden stress)
(e) Use the generalized soil profiles and parameters recommended for the static design.

Case 2 – Liquefaction Initiation

6.65 This case is to ensure adequate performance of the project features during the design seismic event in the event the site soils along the alignment experiences liquefaction as predicted. Design ground parameters and soil resistance conditions for this design are presented in the table below.

Table 6.15 Design Ground Motion Parameters and Excess Pore Pressure for Case 2 – Liquefaction Initiation

Design Seismic Event	Return Period (years)	Design Ground Motion			Design Soil Resistance Parameters
		EPGA (g)	Design k_h	M	
OBE[(a)]	144	0.3[(a)]	0.20	6.6	r_u =0.5[(b)]
MDE	950	0.4	0.27	7.2	r_u =0.5[(b)]

Notes:
(a) No analysis required for the Segment II (Sta. 38+00 to 61+50)
(b) Use the generalized soil profiles and parameters recommended for the static design with r_u =0.5

Case 3 – Post Complete Liquefaction

6.66 This case is to ensure adequate performance of the project features immediately following the design seismic event (post-shaking) in the event the site soils along the alignment experience liquefaction as predicted. Analysis for this case determines if site is susceptible to lateral spreading or flow- type liquefaction under the existing static shear stress with no inertial load. Design ground parameters and soil resistance conditions for this design are presented in the following three tables:

Table 6.16 Design Ground Motion and Excess Pore Pressure for Case 3 – Post Complete Liquefaction

Design Seismic Event	Return Period (years)	Design Ground Motion			Excess Pore Pressure
		EPGA (g)	Design k_h	M	
OBE[(a)]	144	0.0	0.0	6.6	$r_u \approx 1.0$(a)
MDE	950	0.0	0.0	7.2	$r_u \approx 1.0$(a)

Notes:
(a) No analysis required for the Segment II (Sta. 38+00 to 61+50).
(b) Use steady state or residual soil parameter for liquefied soils layers and total stress parameters for the non-liquefiable soil layers for this analysis (see Tables 17 and 18 below).

Table 6.17 Soil Parameters for Case 3 – Post Complete Liquefaction for Segment I (Sta. 17+00 to 38+00)

Layer No.	Approx Depth below O.G. (ft)	Generalized Soil Description	Total Unit Wt. γ_t (pcf)	Shear Strength Parameters[(a)]	Parameters for p-y curves[b]		
					LPILE Soil Type[c]	K (lb/in^3)	ε_{50}
1	0-5.0	Sand/Silty Sand (SP/SM), medium dense, moist	125	c=0.3 ksf, ϕ=30°	1	350	-
2	5.0-11.0	Silty Sand/Sandy Silt (SM/ML), medium dense, saturated, Liquefied	125	S_r= 0.3 ksf	2	-	0.02
3	11.0 - 16.0	Silt/Silty Clay (ML/CL-ML), medium dense/medium stiff, saturated, Liquefied	125	S_r= 0.3 ksf	2	-	0.02
4	16.0-21.5	Silty Sand/Sandy Silt (SM/ML), medium dense, saturated, Liquefied	125	S_r= 0.5 ksf	2	-	0.015
5	21.5-26.5	Silt/Silty Clay (ML/CL-ML), medium dense/medium stiff, saturated, Liquefied	125	S_r= 0.5 ksf	2	-	0.015
6	26.5-30.0	Sand/Silty Sand (SP/SM), medium dense, saturated, Liquefied	130	S_r= 0.7 ksf	2	-	0.01
7	30.0-42.0	Silt/Silty Clay (ML/CL-ML), medium dense/stiff, saturated, liquefied	130	S_r= 0.7 ksf	2	-	0.01
8	42.0-65.0	Sand/Silty Sand (SP/SM), dense, saturated	130	c=0.0 ksf, ϕ=36°	3	125	-

Notes:
(a) c and ϕ= cohesion and angle of friction, respectively (total stress parameters); S_r = Steady state or residual shear strength for fully liquefied soils.
(b) Alternatively, for p-y analysis use 30 percent of the p-values for the liquefied soil layers developed based on parameters provided for static sustained loading conditions.
(c) Reference: Ensoft (2009), 1-Silt with cohesion, 2-Soft clay, and 3- Reese sand below water table.

Table 6.18 Soil Parameters for Case 3 – Post Complete Liquefaction for Segment II (Sta. 38+00 to 61+50)

Layer No.	Approx Depth below O.G. (ft)	Generalized Soil Description	Total Unit Wt. γ_t (pcf)	Shear Strength Parameters[(a)]	Parameters for p-y curves		
					LPILE Soil Type[b]	k (lb/in^3)	ε_{50}
1	0.0-15.0	Silty Sand/Sandy Silt (SM/ML), medium dense, moist	125	c=0.2 ksf, ϕ=33°	1	90	-
2	15.0-18.0	Silty Sand/Sandy Silt (SM/ML), medium dense, saturated, liquefied	125	S_r= 0.4 ksf	2[c]	60	0.02
3	18.0-25.0	Sand/Silty Sand (SP/SM), dense, saturated	125	c=0.0 ksf, ϕ=35°	3	100	-
4	25.0-35.0	Silty Sand/Sandy Silt (SM/ML), medium dense, saturated, liquefied	125	S_r= 0.7 ksf	2[d]	200	0.01
5	35.0-50	Clay (CL), hard to very hard	130	S_u=2.5 ksf	4	800	0.005
6	50-.0-60-.0	Silty Sand/Sand (SM/SP), Very Dense	130	c=0.0 ksf, ϕ=40°	3	150	-

Notes:
(a) c and ϕ= cohesion and angle of friction, respectively (total stress parameters); S_r = residual shear strength of fully liquefied soils, S_u = undrained shear strength of cohesive soils.
(b) Reference: Ensoft (2009), 1-Silt with cohesion, 2-Soft clay, and 3- Reese sand below water table. 4-Stiff clay without free water.
(c) Alternatively, for p-y analysis, use 30 percent of the p-values developed by considering "Reese sand below water table" with c=0.0, ϕ = 30, and k= 40 lb/in^3.
d) Alternatively use 50 percent of the p-values developed considering "Reese sand below water table", c=0.0, ϕ = 33, and k= 60 lb/in^3.

Geotechnical Analysis and Design Recommendations

Channel Design

6.67 Channel design consists of widening the existing cross section by excavating soil from the sides of the existing channel. The sides of the widened channel are proposed to be either sloped for the entire, vertical supported by retaining walls or sloped lower part and vertical upper part supported by retaining walls.

Channel Bank Slope Design

6.68 The project slopes were analyzed and designed in accordance with the methods and requirements, with appropriate adjustments, provided in the Corps Engineering Manuals.

Scour

6.69 Based on the proposed plans, scour protection of the channel bottom and side will be provided by design, i.e. with rip-rap revetment and other mitigation measures approved by the

regulating agencies. Therefore, additional loading and/or loss of capacity due to scour need not be considered in the design of the proposed retaining walls for this project

Slope Stability Analysis

6.70 Slope stability analyses were performed using both the Simplified Bishop and Spencer Methods utilizing the computer program SLIDE (Rockscience, 2010). Short-term (end of construction), steady seepage (long-term or normal operating conditions), and flooding and rapid drawdown conditions were analyzed. The effects of waves, current or other erosion factors which can affect the stability channel slopes were not considered. Stability analyzes were performed based on our interpretation of and evaluation of the soil strengths considering the rate of loading and soil permeability.

6.71 Riprap revetments were considered in the slope analyses. Riprap exerts some driving forces, but provides significant resistances as well. Therefore, it is critical that the as-designed riprap thickness and conditions be maintained during the service life.

6.72 Plots of the slope stability analysis showing the soil types, layering, unit weight, strength parameters and groundwater conditions, the critical failure surface and the minimum FS are included in Appendix D of the Bengal Engineering (2011) report. The calculated minimum factors of safety for a section of the 1.5:1 slope (since modified to 2:1) at Station 30+50 and the required factors of safety (FS) are summarized in the following table.

Table 6.19 Stability Conditions and Factors of Safety at Sta. 30+50

Stability Conditions		Minimum Factor of Safety		Meets Requirements (Y=Yes, N=No)
		Calculated[1]	Required	
End of construction		1.15 (D) -1.9 (U)	1.3	N
Long-Term (Steady Seepage)		1.15 (D)	1.4	N
Flooding[1]		1.05 (D)	1.0	Y
Rapid Drawdown		0.8 (D) -1.57 (U)	1.0	N
Earthquakes[3]	OBE	N/A(4)	1.2	_
	MDE	1.1	1.1	_

Notes:
(1) D= Drained conditions, U= Undrained conditions for fine-grained soil layers.
(2) Conditions not covered in EM 1110-2-1913. Minimum FS =1.0 recommended since the water level at the design flood level is unlikely to persist for long periods of times preceding drawdown, and FS =1.0 for drawdown as per EM 1110-2-1913.
(3) Refers to EM 1110-2-1806 for guidance. No FS is provided in EM 1110-2-1806 but recommends analysis in phases to ensure acceptable performance during and after design events. Required FS are recommended based on the required FS for sliding stability of gravity hydraulic structures, as per EM 1110-2-2100, which is the most recent of the referenced Corps documents.
(4) N/A= Not available. No analyses were performed.

6.73 No seismic stability analyses were performed for the subject slopes since the older 1:5 (H):1(V) (since modified to 2:1) slopes are found not to meet the minimum stability requirements for the static design.

6.74 Results of a long-term stability evaluation for the same slope as above, but with a gradient of 2:1, are presented at the end of Appendix D of the geotechnical report. These analyses show that slopes cut at a gradient of 2:1 should meet the minimum factors of safety for the non-seismic loading conditions.

6.75 Based on the above results and discussion, unsupported cut slopes for the channel widening should be graded at a gradient of **2(H):1(V) or flatter**. The design slope gradient should be based on additional stability analysis, including for the various design earthquake loading and soil resistance cases discussed earlier, and the desired slope performances.

Retaining Structures

Wall Definition

6.76 The proposed structural ERS for the subject project can be categorized as retaining wall, since their main function is to support the sides of the capacity enhanced channel by retaining earth materials to maintain a difference in elevation soils.

Retaining Wall Types

6.77 Retaining walls, with retained soil heights of up to about 15 feet, are proposed to support the channel bank cuts. In the event that construction of 2:1 or flatter slopes is not feasible due to right-of-way or other considerations, we recommend additional retaining walls to support the channel banks. Due to the weak slope and foundation soil conditions, retaining wall types should be selected that will exert minimum demands or loads on the overall or global stability of the slopes.

6.78 Cantilever soldier-pile walls are recommended along the channel banks where retained soil height is ≤ 15 feet and lateral wall movements required to develop active soil pressure conditions are of no concern. For retained soil height >15 feet, conventional cantilever semi-gravity walls supported by footing cap /pile foundations may be used. Gravity-type retaining walls may also be used.

Static Lateral Earth Pressures

6.79 The retaining walls proposed for the subject project may be designed based on the active earth pressures and passive soil resistance using the soil parameters and groundwater conditions provided in the previous sections. Additional design parameters are provided below. No restrained walls requiring at-rest pressure for design is proposed at this time for this project.

6.80 Additional geotechnical parameters necessary to determine active and static passive lateral earth pressures, to evaluate sliding, overturning and bearing stability of the proposed walls are provided below:

- Soil-wall friction angle
  - δ_w =0 for active pressure calculations
  - δ_w =(1/3)ϕ' for passive resistance calculations
- Foundation soil-wall base friction angle (for gravity and semi-gravity types walls)
  - $\delta_b = \phi$' for soil-to-soil = 30° for Segment I, = 25° for Segment II
  - δ_b = (2/3)ϕ' for soil-to-concrete
- Recommended methods for the calculations of the lateral earth pressure coefficients
  - Coefficient for active earth pressures (k_a)
    - If β=0, k_a =0.3 for Segment 1, = 0.4 for Segment II
    - If $\beta \neq 0$, use Figure 6 in NAVFAC DM 7.02 (attached as Figure 3) or the Coulomb's Equation in EM 1110-2-2502 with dw =0
  - Coefficient for at-rest earth pressures (ko)
    - If β=0, k0 =0.5 for Segment 1, = 0.58 for Segment II
    - If $\beta \neq 0$, obtained ko by multiplying the values for β=0 by (1-sin β)
  - Coefficient for passive soil resistance (k_p)
    - If β=0, use kp =4.0 for Segment 1, = 3.0 for Segment II
    - If $\beta \neq 0$, use Figure 6 from NAVFAC DM 7.02 (attached as Figure 3

  Note: Figure 3 is in the referenced Bengal Engineering (2011) report.

6.81 Here, β=0 slope of the retained (for active pressure) or resisting ground (for passive resistance). Note that when the ground surface slopes downward β is negative.

6.82 When the ground surfaces on both sides are horizontal, the proposed retaining walls for the entire alignment may be designed conservatively by using the following parameters:

- Soil total Unit weight, γ_t = 130 pcf
- Coefficient of active earth pressure, k_a= 0.4
- Coefficient of passive earth pressure, k_p= 3.0
- Soil-to-wall base friction angle, $\delta_b = \phi$'

6.83 Groundwater levels appropriate for each loading condition still need to be considered in developing the total earth pressures and resistances.

6.84 Lateral earth pressure for the design of retaining walls for each applicable loading condition should be calculated by considering the layered soil conditions, soil unit weights, the appropriate soil strength parameters and the groundwater conditions presented above.

Seismic Lateral Earth Pressures

6.85 Seismic lateral earth pressures, as a function of wall height, may be calculated using limit equilibrium methods or using the M-O Equations provided in EM 110-2-2502, when applicable, and the ground motion and soils parameters provided in this report. Recommended seismic increment of the active lateral earth pressures for horizontal retained soil surface conditions and assuming no groundwater within the retained soil are presented in Table 6.20 below for a range of wall height (H).

6.86 The seismic increment of the earth pressure force (per one of width of wall) from table below should be applied at a height of (2/3) H above the base of the wall and distributed as an inverted triangle with the pressure increment=0.0 at the base and maximum pressure increment at the top of the wall.

6.87 Soil parameters provided above may be used to determine seismically-induced lateral earth pressures for different ground surface and wall height conditions than those provided in table below. Sloping ground conditions, especially for the resisting side, should be carefully considered when determining soil lateral pressure or resistances.

Table 6.20 Seismic Increment of the Active Earth Pressure, ΔP_{ae} (kips/ft)

k_h	Wall Height = 15 ft	
	Segment 1	Segment II
0.00	0.00	0.00
0.20	2.11	2.39
0.23	2.56	2.94
0.27	3.23	3.66
0.47	8.16	11.95

6.88 The seismic increment of the active pressure for any wall height H (ft), $(\Delta P_{ae})_H$ in kips/ft, with horizontal backfill or retained soil surface can be estimated as follows based on the $(\Delta P_{ae})_{H=15}$ ft provided in above table.

6.89 The estimated seismically induced lateral earth pressures presented in Table 6.20 for k_h=0.47 results in excessively design constraints and anticipated costs for the proposed retaining walls. In such cases, as per EM 1110-2-2502, it should be preferable to accept some small wall displacement during design seismic event. This will result in a more economical wall design since a lower k_h value can be used for structural design. Based on the NCHRP Report 611 (NCHRP, 2008), it is estimated that lateral displacement of retaining walls designed with a k_h value equal to one-third of the EPGA should be less than four (4) inches at the subject project site. Therefore, it is our opinion that retaining walls for the subject project may be designed with k_h= 0.23 (=1/3 x 0.7).

6.90 Based on the above discussion and the EPGA values presented earlier, the recommended design k_h values for hydraulic structures/walls and soldier-pile walls are shown in Tables 6.21 and 6.22 below:

Table 6.21 Design Coefficient of Horizontal Acceleration (k_h) for Hydraulic Structures

Seismic Analysis Case	OBE		MDE
	Segment I	Segment II	Segment I and II
1 (No Liquefaction)	N/R	0.2	0.23
2 (Initial Liquefaction)	0.2	N/R	N/R
3 (Post-Shaking)	0.0	N/R	0.0
N/R = No analysis required.			

Table 6.222 Design Coefficient of Horizontal Acceleration (k_h) for Soldier Pile Walls			
Seismic Analysis Case	**OBE**		**MDE**
	Segment I	**Segment II**	**Segment I and II**
1 (No Liquefaction)	N/R	0.15	0.23
2 (Initial Liquefaction)	0.15	N/R	N/R
3 (Post-Shaking)	0.0	N/R	0.0
N/R = No analysis required.			

6.91 It should be noted that the seismic active pressure provided above need to be combined with the corresponding static active earth pressure when analyzing the retaining walls.

Factors of Safety

6.92 Retaining wall should be proportioned to maintain adequate stability, defined as a minimum acceptable factor of safety (FS), against all applicable failure modes and loading conditions per Corps Engineering Manuals.

6.93 The minimum acceptable factors of safety for the rotational stability evaluation of this type of walls may be taken as follows:

- FSA = Factor of Safety for Active Pressure = 1.0
- FSP = Factor of Safety for Passive Pressure
  = 1.5 for Usual Loading
  = 1.25 for Unusual Loading
  = 1.10 for Extreme Loading

6.94 Recommended minimum factors of safety for gravity and semi-gravity type retaining wall are as presented in the following table:

Table 6.233 Minimum Factor of Safety for Gravity Retaining Walls			
Loading Condition	**Sliding Factor of Safety**	**Requirements for Location of Resultant**	**Bearing Factor of Safety**
Usual	1.5	100% of the Base in Compression (i.e., e≤B/6)	3.0
Unusual	1.3	75% of the Base in Compression (i.e., e≤B/4)	2.0
Extreme	1.1	Within Base (i.e., e<B/2)	>1.0

Foundation Design Recommendations

Foundation Types

6.95 Some semi-gravity retaining walls are proposed to be supported by spread footing foundations. However, relatively weak soils with potentially saturated conditions, especially during floods, exist within the anticipated zone of influence below the footing base. In addition, these footing or wall base will be located within or near relatively steep bank slopes. Due to these unfavorable conditions, low allowable bearing capacity and global stability conditions exist along the alignment.

6.96 Based on the site conditions, either driven piles or drilled shafts may be used as deep foundation elements. However, were ground vibrations and noise associated with driven piles of concern, in the case of the soldier-pile walls, cantilever or anchored, we recommend drilled shafts. Drilled shafts reinforcement may consist of steel H-piles or conventional bar reinforcement.

Foundation Bearing Capacity

Deep Foundations

6.97 The design length should be the longest length necessary to satisfy all applicable performance and stability requirements based on the all applicable loading and soil resistance conditions as presented in the above sections of this report.

6.98 Axial pile capacities provided herein are for the recommended minimum center to center pile spacing of 2.5D or greater, where D is the pile diameter.

Static Design

6.99 Recommended pile ultimate bearing capacities in compression for static design for a range of pile sizes for both driven concrete piles and drilled shafts are presented in the following tables:

Table 6.244 Ultimate Bearing Capacities (Axial Compression) for Driven Concrete Piles

Location	Pile Size (in.)	Ultimate Bearing Capacity (Tons/feet of length) (1) (2)			
		Skin Resistance		End Bearing	
		For Penetration Depth (ft)(1)	Skin Resistance (kips/ft)	For Penetration Depth (ft)(1)	End Bearing (kips)
Segment I (Sta. 17+00 to Sta. 38+00)	15	5'-42'	6.5	>15	20
		42'-65'	20.0	>47	230
	18	5-42'	8.5	>18	30
		42'-65'	30	>50	340
	24	5-42'	10.0	>24	50
		42'-65'	40.0	>50	600
Segment II (Sta. 38+00 to Station 61+50)	15	5-50'	4.5	>15	20
		50'-60'	20.0	>54	230
	18	5-50'	5.8	>18	30
		50'-60'	30	>55	340
	24	5-50'	8.0	>24	50
		50'-60'	40.0	>56	600

Notes:
1. Pile penetration depth is measured from the existing ground surface along the creek bank.
2. Pile ultimate capacities given are for static design.

Table 6.255 Ultimate Bearing Capacities (Axial Compression) for Drilled Shafts

Location	Pile Size (in.)	Ultimate Bearing Capacity (Tons/feet of length) (1)			
		Skin Resistance		End Bearing	
		For Penetration Depth (ft)(2)	Skin Resistance (kips/ft)	For Penetration Depth (ft)(1)	End Bearing (kips)(3)
Segment I (Sta. 17+00 to Sta. 38+00)	24	5'-42'	10.0	>20	0
		42'-65'	12.0	>48	0
	30	5-42'	12.0	>24	0
		42'-65'	14.0	>50	0
Segment II (Sta. 38+00 to Station 61+50)	24	5-50'	8.0	>20	0
		50'-60'	10.0	>56	0
	30	5-50'	10.0	>24	0
		50'-60'	12.0	>55	0

Notes:
1. Pile ultimate capacities given are for static design only.
2. Pile penetration depth is measured from the existing ground surface along the creek bank.
3. End bearing capacities neglected due to small diameter and anticipated wet construction.

6.100 The allowable bearing capacity for the various loading conditions should be determined by dividing the ultimate bearing capacity by the appropriate factor of safety, as discussed above.

Seismic Design

6.101 For the Seismic Design Case 1 (No Liquefaction), the pile bearing capacities provided above for static design may be used.

6.102 For Seismic Design Case 2 (Initial Liquefaction), use 50% of the recommended static skin resistance.

6.103 For Seismic Design Case 3 (Post-Earthquake/Complete Liquefaction), neglect any end bearing resistance or capacity from the liquefied layers. An average ultimate skin resistance of 1.2D ksf may be used for the liquefied layers, where D is the pile diameter in feet.

6.104 Bearing resistances for the non-liquefied case may be taken as equal to the static resistance for all cases.

6.105 Pile foundations at the site are likely to experience some downdrag due to the settlement of the surrounding soil during the MCE event, especially in the event of soil liquefaction. Piles at the site are considered to be of the floating type (i.e., frictional). As such, downdrag may result in pile settlement, but this is not a pile capacity issue. Furthermore, such pile settlement should be limited to the seismically induced ground settlement discussed earlier since before the piles can settle by this amount downdrag, if any, will cease to exist. The resulting settlement is not likely to cause collapse of the walls or endanger life safety. Therefore, it our opinion that downdrag need not be considered further in the analysis and design of the piles for this project.

Shallow Foundations

6.106 Bearing capacity of shallow foundation or spread footings depends on the foundation soil properties, groundwater conditions, footing width and embedment depth, inclination and eccentricity of the applied load, and, when located on a slope, the gradient of the slope and the distance of the footing from the slope face. For the subject project, spread footing-supported retaining walls are likely to be located on or near the creek bank slope. Based on our analysis, the ultimate bearing capacity (q_{ult}) of such spread footings may be taken as:

6.107 Where, B is the width of the spread footing. The allowable bearing capacity for the various loading conditions should be determined by dividing the ultimate bearing capacity by the appropriate factor of safety as discussed above.

6.108 Due to the presence of potentially liquefiable soils, spread footings should not be used along the project alignment where the depth of the groundwater during normal operating conditions is anticipated to be located within a depth B below the bottom of the footing, where B is the width of the footings.

Lateral Capacity of Foundations

6.109 The lateral capacity of foundations depends on their type, size and depth of embedment, and can be evaluated based on the soil parameters provided in the previous sections for various loading conditions.

Shallow Foundations

6.110 Lateral capacity of shallow foundations consists of the passive soil resistance and shear resistance developed at the footing bottom contact surface. Recommended soil parameters for the determination of these resistances are provided above.

Deep Foundations

6.111 Lateral capacities of deep or pile foundations depends on many factors including: pile type, size, length, the cut-off elevations, pile batter, pile location with respect to sloping ground, as well the type and duration of loading. Soil parameters, including those necessary for LPILE type analysis, necessary to determine pile lateral capacity along the project alignment for various loading conditions, are provided above.

Lateral Movements of Retaining Walls

6.112 Lateral movements that the proposed retaining walls may experience are highly dependent on the quality of construction and thus difficult to predict.

6.113 Lateral movements of retaining walls also depend on the height of the wall, retained and foundation soil characteristics, the rigidity of the wall and the design factor of safety.

6.114 For well controlled constructions, the lateral deflection at the top of the cantilever type walls to reach active conditions is estimated to be on the order of 0.5 to 1.0 percent of the wall height. For a 15 foot-high wall, this corresponds to a lateral displacement of about 1.0 to 2.0 inches at the top of the wall. Additional wall deflection due to flexural deformation must be added to this displacement to determine the total lateral deflection of the walls. The maximum vertical settlement adjacent to these walls may be taken as equal to half the lateral movement of the top of the wall. Ground movements behind these retaining walls should not extend beyond a distance of two times the height of the wall.

6.115 Lateral ground movements and ground settlement behind top-down construction walls, such as cantilevered-soldier pile walls, may be limited by in-situ reinforcement of the retained soils. However, these walls will need to be designed considering lateral soil pressures greater than the active pressures due to limiting wall movement.

6.116 Grouted soil-anchored soldier pile walls may be constructed to limit ground movements at some locations where favorable soil conditions exist. Weak clayey soils are generally considered not suitable for in-situ reinforcement or soil-anchor installation. Site specific investigation and additional analysis are necessary to determine the suitability and/or design of such walls for the project.

Foundation Settlement

6.117 Foundation soil supporting the spread footings and deep foundations for the proposed improvements are not likely to experience significant net increase in vertical stress. Therefore, foundations are not likely to experience any significant non-seismic settlement provided they are designed and constructed in accordance with the recommendations provided herein.

6.118 As stated above, grounds along the project alignment are susceptible to liquefaction-induced settlement during the design seismic events. Spread footing foundations at the site are likely to experience the same seismic settlement as the ground surface settlement, presented earlier in this document.

6.119 It should be noted that the general area, including the structures supported by foundations founded above or within the potentially liquefiable soil layers, are likely to experience the amount of settlement estimated above irrespective of the construction of the proposed channel improvements.

Corrosion Potential

6.120 Two soil samples retrieved from the exploratory borings were tested for soil corrosivity indicators. Results of these tests are included in Appendix B of the Bengal (2011) report. Based on these results, the resistivity of the site soils ranges from 1,300 to 3,800 ohm-cm and pH varies from 7.5 to 7.8. The chloride and the sulfate contents of the site soils range from 110 to 280 ppm and 63 to 225 ppm, respectively. Based on these results, the site soils are not considered corrosive to metal or concrete (CALTRANS 2003, AASHTO 2007).

6.121 It should be noted, however, that the project site is near the Pacific coast. Caltrans (2003) considers marine atmosphere, defined as that atmosphere within 1000 feet of ocean or tidal water, as corrosive to reinforced concrete substructures.

6.122 Bengal Engineering's (2011) report recommended that structures constructed within 1000 feet of tidal influence or sea water intrusion be provided with adequate corrosion protection. Potential corrosion protection measures include, but are not limited to, use of low permeability concrete, protective coating for reinforced concrete surfaces, increased concrete cover over reinforcement, and epoxy coated reinforcement.

Drainage Design Considerations

6.123 Due to the extensive presence of low plasticity, fine-grained soil along the project alignment, subgrade drainage and prevention of soil migration are considered critical design issues for the subject project.

6.124 All retaining walls for the project should be provided with adequate back-drains consisting of fabric or fabric enclosed gravel filters and weep holes to drain well the retained soils and to prevent or minimize build up of excessive hydrostatic water pressures during normal conditions and flooding. All filters should be designed to also prevent migration of fines, which can cause ground settlement and clogging, in order to maintain long-term effectiveness.

6.125 Design of the subsurface drainage or filter design should consider the fine-grained and non-plastic nature of the anticipated subgrade level along the channel alignment and at the back of the retaining walls. Based on the soil conditions, it is our opinion that geotextile filter, composite filter and fabric enclosed gravel filters, alone or in combinations, should be used at the site. Granular transition filters underneath the geotextile filters should be used where subgrade soils are fine-grained (ML, CL-ML and CL). Granular filters alone are likely to be expensive and of limited effectiveness.

6.126 Subsurface drainage is necessary to facilitate drainage of groundwater and infiltrated runoff from the subsurface materials behind the retaining walls. The drainage elements for the walls should consist of a vertical drainage layer inserted behind the wall stems or wall facing elements, together with weep holes and/or a collection drain installed near the bottom of the wall. Geotextile-wrapped granular filter is also recommended to be placed at the contact of the wall backfill and in-situ soils for the walls constructed using the bottom up method (e.g. gravity and semi-gravity walls). The permittivity and the Apparent Opening Size (AOS) of the geotextiles used for the drain should be selected based on the anticipated backfill or retained soil characteristics.

6.127 The vertical drainage layer behind the lagging /facing of soldier pile walls should consist of a geocomposite drain capable of draining groundwater from subsurface soils. Voids, if any, behind the lagging or geocomposite, should be backfilled with self compacting and well-drained sandy materials, such as concrete sand, prior to facing construction. The materials used for filling these voids should be approved by the Engineer. Grouting should not be allowed as a method for backfilling such voids.

7. STRUCTURAL BASIS OF DESIGN

GENERAL

7.1 The main structural elements in this project consist of soldier pile retaining walls. These walls are divided into two segments basis on their location within the project. The project will also have some retaining walls supported on spread footings within certain the transition zones and confluence zones. A concrete soldier pile retaining wall system was chosen based on its constructability, reliability to provide load bearing resistance, and its cost effectiveness.

7.2 These walls are categorized as retaining walls per EM 1110-2-2502 since their primary purpose is to retain earth on either side of the improved channel. The Design Flood Elevation has been established to be approximately 10 to 12 feet above the existing channel invert. The elevations at the top and bottom of the walls have also been set based on the hydraulic requirements of the project.

7.3 Preliminary retaining wall sizing was performed for the 60% design to assist with the layout, pile design recommendations, and geotechnical settlement analysis. The final detailed structural analysis for the retaining walls will be determined at the 90% design phase, along with the typical structural construction details and retaining wall sections.

REFERENCE DOCUMENTS

7.4 Analysis of the new retaining wall structures and their components was based on the following publications:

- CBC 2007: "California Building Code" 2007
- EM 1110-2-2906: *"Design of Pile Foundations" USACE, January 1991*
- EM 1110-2-2104: *"Strength Design of Reinforced Concrete Hydraulic Structures" USACE, Change 1, August 2003"*
- EM 1110-2-2502: *"Retaining and Floodwalls" USACE, September 1989*
- EM 1110-2-2507: *"Structural Design of Closure Structures for Local Flood Protection Projects", USACE, March, 1994*
- EM 1110-2-2504: *"Design of Sheet Pile Walls", USACE, March 1994*
- ACI 318-05: "*Building Code Requirements for Structural Concrete and Commentary" American Concrete Institute, 2005*
- ACI 350-06: "*Code Requirements for Environmental Engineering Concrete Structures and Commentary" American Concrete Institute, 2006*
- *ASCE/SEI 7-05: "Minimum Design Loads for Buildings and Other Structures*" American Society of Civil Engineers, 2005.

SOLDIER PILE WALL ANALYSIS AND DESIGN

The reinforced concrete retaining wall stability analysis is based on the procedures outlined in Table 5-1 of EM 1110-2-2504. This manual establishes the requirements for the design of the soldier pile walls under various load cases.

7.5 The soldier pile walls are designed with the consideration of the following factors of safety for stability from Table 5-1 in EM 1110-2-2504:

Factor of Safety for Passive Pressure (FSP) = 1.5 for Usual Loading
= 1.25 for Unusual Loading
= 1.1 for Extreme Loading

Factor of Safety for Active Pressure (FSA) = 1.0

7.6 The load cases above from EM 1110-2-2504 is the same as the load cases for retaining walls from EM 1110-2-2502 which is further discussed below. Since the soldier pile walls are considered retaining walls and the load cases are similar, the use of the factors of safety for stability will be reasonable.

7.7 Lateral movement of the soldier pile walls is estimated to be on the order of 0.5 to 1.0 percent of the wall height at the top of the wall. The maximum vertical displacement is estimated to be half of the lateral movement.

7.7 The soldier pile walls were designed using SHORING SUITE design software with modifications of the load factors and safety factors for stability. SHORING SUITE is a software design package that contains 4 Modules: SHORING, EARTHPRES, SURCHARGE, and HEAVE. These modules are both design and analysis tools.

The calculations performed by SHORING SUITE is based on Federal Highway Administration (FHWA) methods, US Navy DM-7 (NAVFAC) manual, the Steel Sheet Design manual (USS), and Trenching And Shoring Manual of the California Department of Transportation. It can be used for complex ground conditions, surcharge loads, and many types of shoring walls including: braced cuts, cantilever walls, bulkhead walls, sheet pile walls, soldier piles & lagging systems, tangent pile walls, slurry walls, and any flexible walls. The program links the EARTHPRES and SURCHARGE modules so that the data from these two programs can be directly imported into SHORING.

REINFORCED CONCRETE RETAINING WALL ANALYSIS AND DESIGN

7.8 The reinforced concrete retaining wall stability analysis is based on the procedures outlined in EM 1110-2-2502. This manual establishes requirements for sliding resistance, minimum bearing capacity and overturning stability for inland floodwalls under various load cases. The requirements from Table 4-2 of EM 1110-2-2502 are as follows:

Table 7.1 Retaining Wall Stability Criteria

Load Case	Loading Condition	Sliding FS	Overturning Criteria Minimum Base Area in Compression	Minimum Bearing Capacity Safety Factor
R1	Usual	1.5	100%	3.0
R2	Unusual	1.33	75%	2.0
R3	Earthquake	1.1	Within Base	>1.0

7.9 The different loads cases are defined as follows:

- Case R1 – Usual Loading: The backfill is in place to its final elevation, surcharge loading is present, backfill is dry and moist, and the water level is to the design flood level (top of wall less freeboard).
- Case R2 – Unusual Loading: Same as Case R1, except water in backfill is to top of wall. Other short-term loads are applied as required.
- Case R3 – Earthquake: Same as Case R1. Induced earthquake forces are acting on the wall.

7.10 The stability of the floodwalls was checked utilizing the Corps' CTWALL Program. The retaining walls were designed using RetainPro retaining wall design software with modifications of the load factors.

REINFORCED CONCRETE WALL DESIGN

7.11 The design of the reinforced concrete for the retaining walls is based on EM 1110-2-2104. The guidance in EM 1110-2-2104 allows the reinforced concrete to be designed using either a Single Load Factor Method or a Modified ACI 318 Method. The structures on this project are designed using the Single Load Factor Method. This method utilizes a 1.7 load factor for dead and live loads and modified by a hydraulic factor of 1.3 for hydraulic structures. The total single load factor is:

$U_h = H_f\,[1.7(D+L)]$, which is essentially 2.21(D+L).

7.12 For load cases involving earthquake loads, the single load factor will be:

$U_h = H_f\,[0.75U_{WorE}]$, which will be equivalent to $0.98U_{WorE}$.

7.13 For the equations above, the following terms are defined as follows:

U_h = factored loads for hydraulic structures
H_f = Hydraulic factor
D = forces and moments from dead loads
L = forces and moments from live loads
U_{WorE} = factored loads for wind or earthquake forces

7.14 The loads and loading combinations required for analysis are outlined in EM 1110-2-2502.

- Equivalent Earth Fluid Pressure - The geotechnical engineer provided the equivalent earth fluid pressure.

- Earthquake Earth Pressure - The geotechnical engineer provided the earthquake earth pressure.

- Earthquake Inertia Force - The earthquake inertia force from the walls was determined per CBC 2007. This force is determined by equation below and acts at the center of gravity of the wall.

$$F_p = 0.4S_{DS} \text{ x } I \text{ x } W_p$$

DEEP FOUNDATION DESIGN

7.15 The most economical deep foundation alternatives for the soldier piles are drilled caissons. Driven piles are not recommended due to the presence of the existing structures that may be susceptible to damage from vibrations.

7.16 The proposed soldier pile walls utilize 30" diameter caissons with embedded wide flange beams to resist the loads. The system is designed to adequately resist the expected forces from lateral earth, water and seismic load conditions. The design of the caissons will be in accordance with the requirements of EM 1110-2-2104.

SHALLOW FOUNDATION DESIGN

7.17 The proposed retaining walls other than the soldier pile walls will be supported on shallow foundation spread footings. The retaining walls on shallow foundations will be designed to adequately resist the expected loads from earth pressures and flood flows and will vary in height from 4.0 ft to 10.0 ft.

7.18 Based upon the geotechnical analysis the footing of the retaining wall will be designed based upon a minimum soil bearing capacity of 750 x B (psf). Where b is the width of the footing. Based on the allowable bearing value, total settlement of the shallow footings are anticipated to be less than one inch, and differential settlements between footings spaced approximately 30 feet apart is expected to be on the order of ½ inch or less.

LIQUEFACTION DESIGN CONSIDERATION

7.19 Per the geotechnical analysis, the site is potentially susceptible to seismically induced settlement and lateral spread from liquefaction. The liquefaction potential and the extent of the liquefaction vary along the alignment of the Lower Mission Creek and on the design earthquake event.

CONSTRUCTION MATERIAL

7.20 Concrete - All structural concrete for the retaining walls shall meet the following minimum requirements:

- The concrete will have a 28-day compressive strength of 5000 psi.
- The structural concrete max water content is 0.45.
- The unit weight for concrete to be used in design is 150 lbs/ft^3.
- Reinforcing Steel - All reinforcing steel shall meet the following minimum requirement:
  - Reinforcing steel shall conform to ASTM A 615, Grade 60.
  - Reinforcing development lengths and splices will be in accordance with EM 1110-2-2104.

7.21 Structural Steel - All structural steel shall meet the following minimum requirement:

- Structural steel shall conform to ASTM A 572, Grade 50.

8. CARE OF TRAFFIC DURING CONSTRUCTION

8.1 Hauling of materials and equipment to and from the project site would primarily use US 101 and the three nearby on/off ramps. Carrillo Street on/off ramp is located near the upstream end of the project, while Castillo Street on/off ramp is near the lower end and provides the most direct route to the proposed staging and stockpiling sites. Access and haul routes from the staging and stockpiling sites to the specific creek construction site would use roads that are nearest to the creek, while taking the most direct route. De La Vina, Castillo, and Bath Streets would generally be the main haul routes above US 101; Castillo, Montecito, Yanonali, Mason, and State Street would provide access during construction downstream of US 101. Selected haul routes will be coordinated with the City of Santa Barbara.

9. CARE AND DIVERSION OF WATER DURING CONSTRUCTION

9.1 Surface flows within the construction area will be controlled by dikes, diversion pipes, and pumps. The spillway, embankment, and rock ramp excavation could be conducted throughout the year, but during the rainy seasons weather should be monitored for storm activity and protection of the work site from storm flows provided by the contractor. Groundwater should not be encountered at the proposed construction depths outside of the rainy season.

9.2 No construction or sediment removal would occur anywhere within the project area between December 1 and March. Project construction and sediment removal in the estuary would be accomplished between June 1 and November 30 when water flow is usually at a minimum. Construction upstream from the estuary could be accomplished between April 15 and November 30, provided that no continuous surface flow exists. Water flowing deeper than 0.5 inches through the Caltrans channel between April 15 and June 1 would require temporary cessation of construction activities in the streambed.

9.3 Diversion of water for the estuary will be performed via dividing a suitable length of the estuary down the middle with an impermeable barrier, perhaps sheet piling. The length should be as long as practicable to minimize repetition of this divide and dry procedure for making temporary construction enclosures. Construction of the channel shall be performed on one bank at a time only. A lateral cofferdam in mid-stream shall not be acceptable because of turbidity and fine sediments that would be conveyed downstream to the coastal lagoon.

9.4 Diversion of water upstream of the estuary will be performed via a bypass culvert consisting of a minimum 36” HDPE pipe. The channel upstream of the construction will be dammed via a lateral cofferdam forcing the water to be conveyed in the 36” HDPE pipe. The bypass culvert will allow for temporary backfill to be placed within the channel section to assist with construction activities.

10. CARE OF HABITAT DURING CONSTRUCTION

10.1 The area to be disturbed during construction is within an environmentally sensitive area. To limit the impact to this sensitive habitat, the work area footprint will be limited to avoid unnecessary destruction of native plans and species. The specific work area will be identified in the plans and specifications and additionally within the *Engineering Considerations and Instructions for Field Personnel (ECIFP).*

11. DISPOSAL OF MATERIALS

11.1 Approximately 75 percent of material will need to be transported to the disposal sites either at the Tajiguas Landfill, located 25 miles west of the project site, or South Coast Recycling and Transfer Station, located 12 miles from the project site..

11.2 Potential facilities that could be utilized for treatment and/or disposal of impacted, non-hazardous soils include the following: Thermal Remediation Solutions in Azusa, California; Santa Maria Sanitary Landfill, in Santa Maria, California; and Buttonwillow Landfill, in Buttonwillow, California.

12. SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

12.1 A Supplemental Environmental Assessment for the proposed improvements is currently being prepared by the Corps. A copy of the findings will be included in Appendix E and incorporated in the contract drawings.

13. REAL ESTATE PLAN

13.1 The Real Estate Plan (Corps 2000) was prepared by the Corps for inclusion with the Feasibility Report. Acquisition of real property for the Lower Mission Creek Project affects 60 parcels in a variety of uses including commercial, single family residential, multi-family residential, vacant land, a church, etc. Approximately 3.27 acres of land affecting 57 ownerships will be acquired. Included in the total acreages is a 5,000-square-foot sponsor-owned parcel. Also included in the total acreage are temporary easements consisting of 0.31 and 1.13 acres to be acquired in fee. The project consists of mandatory buyouts of 8 lots along with improvements (structures) located on them.

13.2 The preliminary 60% design and real estate plan was prepared by SBCFC&WCD, in coordination with the Corps and City of Santa Barbara. There have been updates to the project impacts and design, which have required an updated estimate to be performed. Based upon the current design and proposed project improvements the real estate property for the Lower Mission Creek Project affects 58 parcels in a variety of uses including commercial, single family residential, multi-family residential, vacant land, a church, etc. Approximately 3.43 acres of land affecting 53 ownerships will be acquired. Also temporary construction easements approximately 0.86 acres are to be acquired.

13.3 The estimated real estate cost for the project is $15,490,000. A final real estate plan will be performed with final 100% plans, specifications, and cost estimate.

13.4 Real Estate Plan for the separate bridge projects is prepared by the City of Santa Barbara and excluded from the Lower Mission Creek real estate cost. Since the City is scheduled to proceed with the bridge improvements ahead of the Lower Mission Creek project.

14. ADAPTIVE CHANNEL MAINTENANCE PLAN

14.1 The purpose of the Adaptive Channel Maintenance Plan (Plan) is to establish criteria to be followed by the non-Federal sponsor when conducting maintenance of the channel along the Lower Mission Creek Project reach to reduce environmental impacts of channel maintenance while maintaining the design capacity of the project improvements. The Plan identifies methods to maintain the channel and protect the fish habitat enhancements installed as part of the project. It also defines an approach to use in adapting the planned maintenance to changes in the channel conditions that will occur over time due to natural fluvial processes, flood events, and changed environmental requirements. Detailed information on the Plan is presented in Appendix F.

14.2 The channel maintenance described in the Plan will supplement the channel maintenance and environmental protection practices in the non-Federal's countywide routine channel maintenance, adopted in 2001.

14.3 The Lower Mission Creek maintenance will be conducted under the provisions of the SBCFC&WCD's current permits for channel maintenance from the CDFG, Corps, and RWQCB. In addition, the work will be performed in compliance with the endangered species protection measures specified by the USFWS and NOAA Fisheries for the SBCFC&WCD's routine maintenance program.

15. COST ESTIMATES

FIRST COSTS

15.1 The estimated first costs were developed using July 2011 (4Q11) price levels. They include estimates for construction for flood risk management, restoration, relocations, mitigation; planning, engineering, and design; and construction management.

15.2 Unit costs were derived from the known unit costs for similar work in the Santa Barbara County area. Contingency allowances were assigned for each item of the cost estimate. The lands and damages costs were provided by SBCFC&WCD. Costs for planning, engineering, and design, and construction management are based on estimated costs to complete the project.

15.3 The cost associated with the City of Santa Barbara's bridge projects (including right-of-way) are excluded from the Total Project Cost, since these bridges would be constructed by the City regardless of the Corp's Lower Mission Creek project. At this time, the bridge projects are on a separate design and construction schedule and will be constructed prior to any of the channel improvements. The project team worked together to determine the improvements and lands and damages to be obtained by the City and excluded them from the project cost estimate.

15.4 A summary of first costs for the Lower Mission Creek Project is shown in Table 15.1.

Table 15.1 Design Documentation Report Cost Estimate
(2011 Price Level)

Account No.	Description	Amount ($1,000)
01	Lands and Damages	15,490
08	Roads, Railroads, and Bridges	3,897
09	Channels & Canals	46,971
30	Planning, Engineering, & Design	5,089
31	Construction Management	3,051

ANNUAL OPERATION, MAINTENANCE, REPAIR, REPLACEMENT, AND REHABILITATION COSTS

15.5 Operation and maintenance (O&M) activities would occur after the project is constructed in order to keep project features functioning as designed. Future maintenance activities would be associated with the earthen creek bottom, channel walls, creek banks and vegetation, overflow culvert, interior drainage, habitat expansion zones, rock energy dissipators, and other appurtenances.

15.6 Any areas where sediment deposition and/or vegetation growth occur beyond 15 percent of the channel capacity would be required to be removed to maintain the capacity of the project reach. It is estimated that sediment removal would occur at an interval as often as once a year. However, when several low-flow years occur sequentially, sediment removal might occur every two to three or more years.

15.7 An O&M manual will be prepared prior to construction of the flood risk management improvements in accordance with ER 1130-2-304, Project Operations, and the applicable provisions of ER 1150-2-301, Local Cooperation. The O&M manual would incorporate the Adaptive Channel Maintenance Plan, as described in Appendix G of this DDR. The non-Federal sponsor will be responsible for the operation and maintenance of the flood risk management improvements.

16. PLAN RESPONSIBILITIES

COST APPORTIONMENT

16.1 The following table presents the apportionment of first costs between Federal and non-Federal interests for the Lower Mission Creek Project.

Table 16.1 Cost Apportionment
(XXXX Price Level)

Account No.	Description	Federal ($1,000)	Non-Federal ($1,000)	Total ($1,000)

FEDERAL RESPONSIBILITIES

16.2 The Federal Government will be responsible for the following:

- Provide detailed design and construction administration necessary for implementation of flood control and habitat expansion;
- Evaluate and determine applicability of credit against local sponsor's costs for the project pursuant to Section 104 of P.L. 99-662. The amount of credit, where applicable, will be dependent on the actual construction cost of the project and verification of costs for those items submitted by local sponsors for credit; and
- Develop a management plan for operation, maintenance, and rehabilitation of fish and wildlife mitigation and enhancement features of the project.

NON-FEDERAL RESPONSIBILITIES

16.3 The non-Federal interests will be responsible to:

- Pay 5 percent of the cost in cash of the project assigned to flood control during construction of the project;
- Provide all lands, easements, rights-of-way, and dredged and excavated material disposal areas;
- Perform all alterations and modifications of highways, roads, streets, highway bridges, utilities, and irrigation and drainage facilities required in connection with the project;

- Provide, without cost to the United States, all relocations of existing recreational facilities, Obtain the approval of the Secretary of the Interior to relocate, as necessary for project construction, those recreation properties which were acquired or developed with assistance from Land and Water Conservation Fund Act monies;

- Assure access to all people on equal terms for approved recreational use;

- Manage and maintain all eligible National Register of Historic Places properties in accordance with a treatment plan developed in coordination with the Federal Advisory Council on Historic Preservation and the State Historic Preservation Office;

- Administer the operation, maintenance, and rehabilitation of fish and wildlife mitigation and fish and wildlife enhancement features of the project in accordance with a management plan to be developed and approved by the Secretary of the Army. The cost of operation, maintenance, and rehabilitation for mitigation lands will be borne entirely by the non-Federal interests. The costs for operation, maintenance, and rehabilitation of enhancement lands will be shared 75 percent by the Government and 25 percent by the non-Federal interests;

- Give the Government a right to enter upon, at reasonable times and in a reasonable manner, lands which the Counties own or control, for access to the project for the purpose of inspection, and for the purpose of repairing and maintaining the project if such inspection shows that the local sponsors for any reason are failing to repair and maintain the project in accordance with the assurances hereunder and have persisted in such failure after a reasonable notice in writing by the Government delivered to the responsible local official. No repair or maintenance by the Government in such event shall operate to relieve the local sponsors of responsibility to meet their obligations as set forth in this Agreement, or to preclude the Government from pursuing any other remedy by law or equity;

- Hold and save the United States free from damages due to the construction, operation, and maintenance of the project, excluding damages due to fault or negligence of the United States or its contractors; and

- Hold and save the United States free from all damages arising from water rights claims resulting from construction, maintenance, and operation of the project.

17. IMPLEMENTING THE PLAN

GENERAL

17.1 A Project Management Plan (PMP) for the Lower Mission Creek Project has been prepared and is currently in use.

PREPARATION OF PLANS AND SPECIFICATIONS

17.2 The preparation of Plans and Specifications will take approximately 18 months to complete.

SCHEDULE OF DESIGN AND CONSTRUCTION

17.3 The project will be schedules to be advertised for construction in the fall of FY 2012 and awarded in the winter of FY 2012 for the Reach 1A improvements. It is expected that a reach per year will be constructed once funding is approved for the project. The each contract will take about 9 months to construct and complete project is scheduled for completion by the end of FY 2019.

18. PROJECT PARTNERSHIP AGREEMENT

18.1 The Santa Barbara County Flood Control & Water Conservation District has provided a letter of intent acknowledging sponsorship requirements for the Lower Mission Creek Project. Prior to the start of construction, the non-Federal sponsor will be required to enter into an agreement with the Federal Government that it will comply with Section 221 of the Flood Control Act of 1970 (P.L. 91-611), and the Water Resources Development Act of 1986 (P.L. 99-662).

19. RECOMMENDATIONS

19.1 This report describes in detail the general design, including departures from the previously approved plan, of the portion of the Lower Mission Creek Project. It is recommended that this report provide the basis for the development of plans and specifications for the construction of Reaches 1 to 7 of the Lower Mission Creek Project.

19.2 The rounded combined Federal and non-Federal first costs of the recommended Lower Mission Creek Project are estimated at $81,929,000 based on July 2011 price levels.

APPENDIX 2

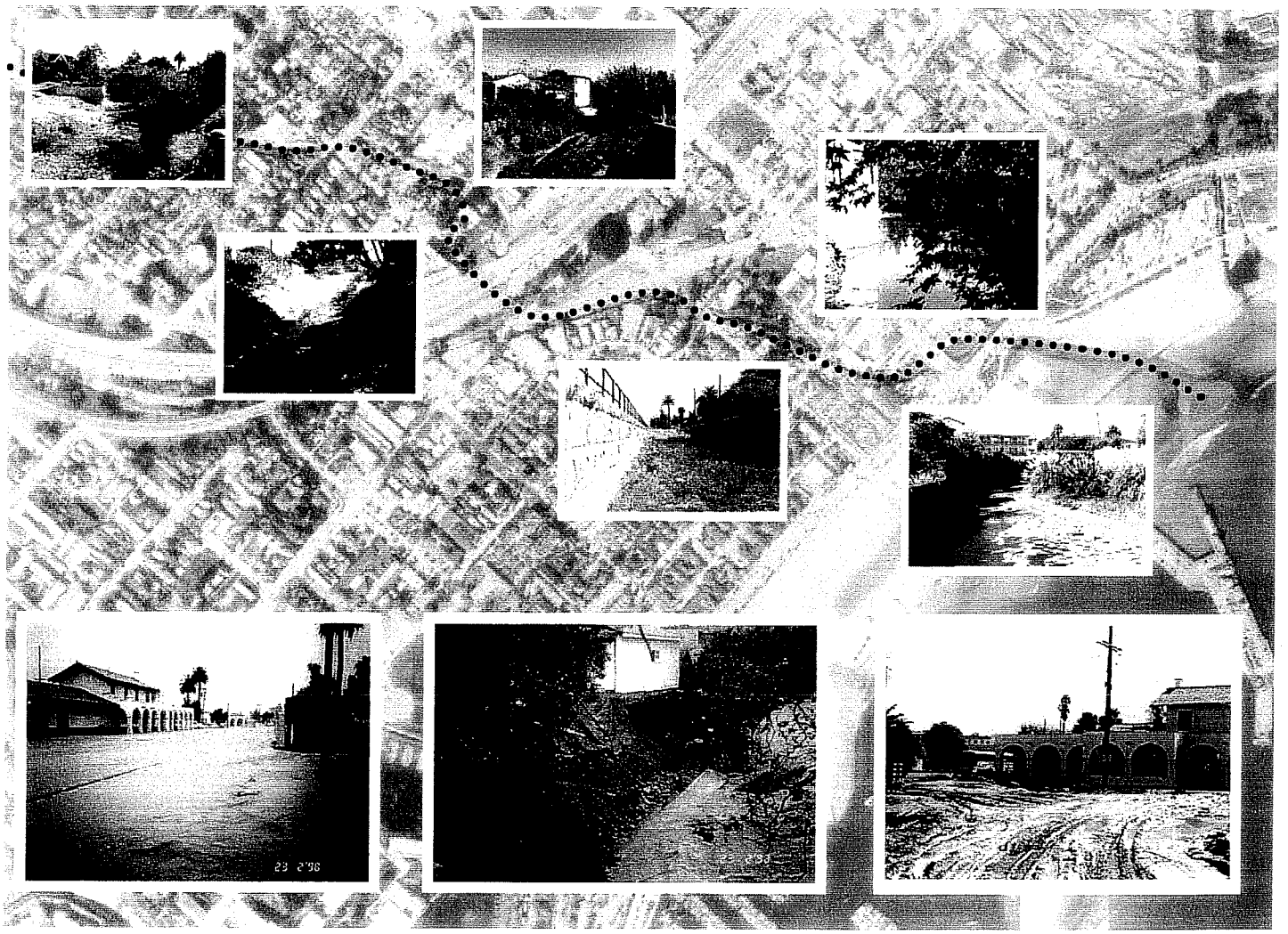
Lower Mission Creek, USACE Feasibility Study (2000)

US Army
Corps of Engineers
Los Angeles District
South Pacific Division

FEASIBILITY REPORT, September 2000

SANTA BARBARA COUNTY STREAMS

LOWER MISSION CREEK FLOOD CONTROL FEASIBILITY STUDY



Los Angeles District, Corps of Engineers
Planning Division
P.O. Box 532711
Los Angeles, California 90053

CESPD-ET-P (September 2000) (1105) 1st End Sloan/tjm/415-977-8168
SUBJECT: Feasibility Report for Lower Mission Creek, Santa Barbara County Streams, California

DA, South Pacific Division, Corps of Engineers, 333 Market Street, Room 923
San Francisco, CA 94105-2195 28 September 2000

FOR Deputy Commanding General for Civil Works, ATTN: CECW-B, U.S. Army Corps of Engineers, 441 G Street, NW., Washington, DC 20314-1000

I concur in the conclusions and recommendations of the District Commander.

PETER T. MADSEN
Brigadier General, U.S. Army
Commanding

EXECUTIVE SUMMARY

SANTA BARBARA COUNTY STREAMS, LOWER MISSION CREEK FLOOD CONTROL FEASIBILITY STUDY

Authority and Purpose

The Los Angeles District has been directed to perform feasibility level studies of flood control alternatives in the City of Santa Barbara, California as authorized by Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session).

The purpose of this study is to investigate the feasibility of flood control along the lower reach of Mission Creek in Santa Barbara, California. The City of Santa Barbara has experienced approximately 20 damaging floods since 1900.

This feasibility study completes the planning process of formulating and evaluating the array of alternative plans identified in the reconnaissance study and additional alternatives developed during the feasibility study, and selects a plan that maximizes net economic benefits while addressing flood control, environmental restoration and other needs identified and defined throughout the planning process. The results presented in this report were developed in accordance with Federal water resources planning principles, guidelines, procedures, and policies.

Study Participants

The Feasibility Report, together with the Environmental Impact Statement / Environmental Impact Report (EIS/EIR) was prepared by the U.S. Army Corps of Engineers, Los Angeles District, in cooperation with the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD) and the City of Santa Barbara (City). The SBCFC&WCD is the non-Federal Sponsor of this study and together with the City, is expected to share the non-Federal cost of implementing the recommended project. Coordination was also conducted with the Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), California Department of Fish and Game (CDFG), California Coastal Commission (CCC), Regional Water Quality Control Board (RWQCB), State Historic Preservation Office (SHPO), other interested organizations and parties.

Problem Description

The primary problem affecting the lower Mission Creek area is the threat of flooding to property, which affects the health, safety and well being of the residents of Santa Barbara.

Secondary problems are the environmental impacts of flooding, urbanization, and the uncoordinated individual bank stabilization measures. The bank stabilization efforts have

degraded the natural characteristics of the creek bottom by unconfined placement of concrete material found in numerous locations along the creek. Persistent non-native vegetation, especially giant reed, has invaded and overwhelmed the creek's environs because of the loss of the riparian community. Inhospitable patchy bank treatments, and periodic maintenance is necessary, in part, to control bank erosion and prevent further encroachment of those weedy species and subsequent loss of conveyance capacity.

Planning Objectives

The Federal objective of water and related land resources project planning is to contribute to the overall National Economic Development (NED) and National Environmental Quality (NEQ). NED contributions include increases in the net value of the national output of goods and services, expressed in monetary units. NED contributions are consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable Executive Orders, and other Federal planning requirements.

The following specific objectives of the feasibility study were based on review of problems and needs and in coordination with the desires of the local sponsors and the Mission Creek Consensus Group:

- Provide increased flood protection for the residents and businesses of Santa Barbara along the lower mile of Mission Creek;
- Restore the major species of a native riparian community along the project reach;
- Remove and suppress invasive non-native vegetation and replace with native plants;
- Remove man-made construction materials along the creek bottom and restore to natural; and
- Enhance the aquatic habitat by changing the streambed characteristics.

Plan Formulation

At the request of the local sponsor and as indicated in earlier Corps studies whereby expected flood control benefits for the upper reaches of Mission Creek would not likely warrant federal participation, this study focuses on the reach most prone to flooding; approximately the last mile of Mission Creek, beginning just downstream of Canon Perdido, across 13 bridges, and ends at Cabrillo Boulevard near the Pacific Ocean. It also includes the Laguna Drainage area, which is reach by overflows from Mission Creek.

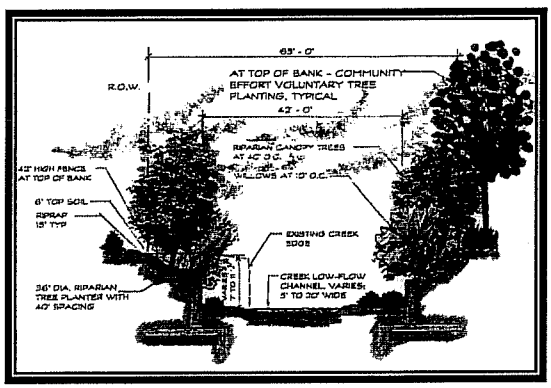
A total of 12 alternatives were developed in the feasibility study including the "No Action" alternative. Alternatives 2 and 3 were designed while placing high emphasis on using as much of the creek's existing footprint as possible with minimal creek widening allowed while replacing only the most constricted bridges. These alternatives would consequently have limited conveyance capacity estimated at 2500 cubic feet per second (cfs), which would provide approximately 15-year level of flood protection. Alternatives 2 and 3 were found to be not economically feasible and will not warrant federal participation. Subsequently they were eliminated from further consideration.

Nine other alternatives were developed with a 3400 cfs conveyance capacity (approximately 20-year level of flood protection). Alternatives 4 through 7 would use the creek's existing

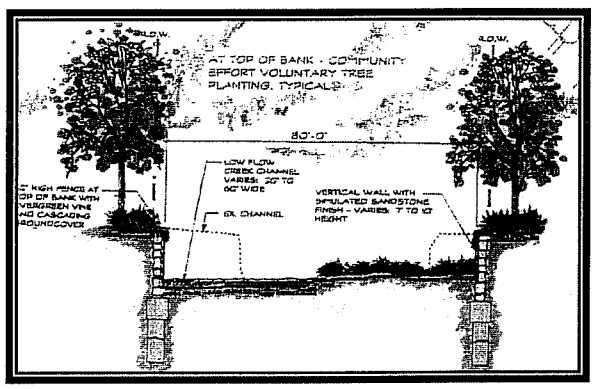
alignment throughout the project reach. The section of the creek between Gutierrez and Chapala Streets (referred to as the "oxbow"), has the sharpest bends and the least conveyance capacity. This reach would be widened to accommodate flows of up to 3400 cfs. Seven bridges would be removed and replaced. Alternatives 4 would use vertical wall sides, while Alternatives 5 to 7 would use varying amounts of vegetated-stepped walls and vertical walls would then be used where right-of-way is constricted.

Alternatives 8 through 11 differs from the earlier alternatives in that, it would incorporate an overflow culvert that would convey a significant amount of higher stormwater flows across the oxbow. The oxbow would not require any modification and would remain to carry low flows. Five bridges would be removed and replaced.

Alternative 12 has the same alignment as alternatives 8-11. It would incorporate a longer overflow culvert and would require the removal and replacement of four bridges. The creek banks would be protected using a combination toe wall and vegetated-riprap slope. Vertical walls would be used along the most constricted rights-of-way.



Creek Banks with Combination toe wall and vegetated riprap slope



Creek Banks with Vertical wall sides

The proposed alternatives except for the No Action, would have natural bottom. They would include the creation of numerous habitat expansion areas created on excess land from property acquisitions. For all the structural alternatives, future maintenance is an integral part of the project design in order to maintain its form and function.

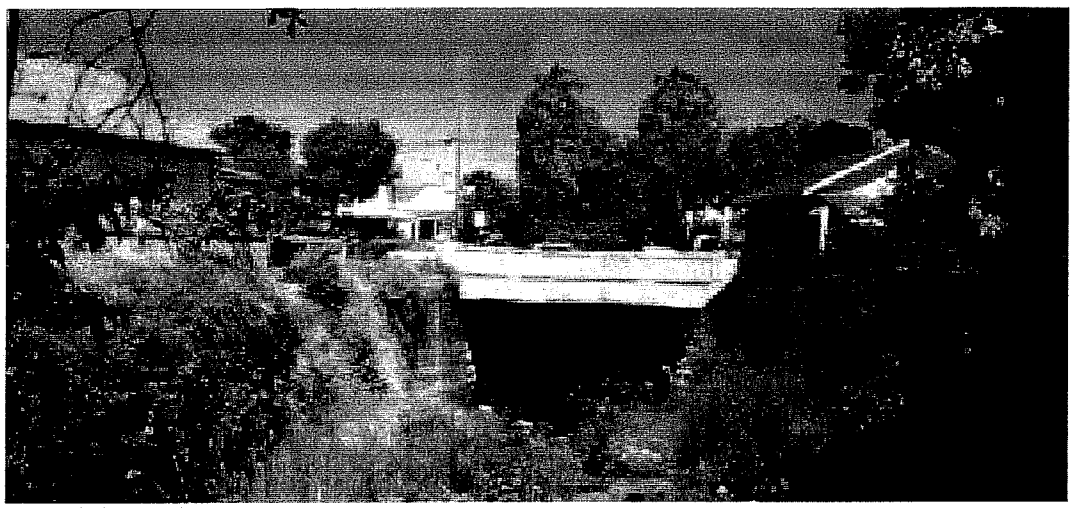
Together with the No Action alternative, Alternatives 6, 8, and 12, which best represent the project objectives and meet federal economic requirements were carried forward for full development and evaluation in the EIS/R. This combined environmental document has been prepared in compliance with the National Environmental Protection Act (NEPA) and the California Environmental Quality Act (CEQA).

In order to select the proposed Recommended Plan, the final alternatives were evaluated based on comparison to the No Action Plan on meeting the project objectives, their contributions to National Economic Development (NED), and their environmental benefits and impacts, and their compliance with environmental laws, policies, and other guidelines.

Recommended Plan

Alternative 12 best satisfies the project objectives. It provides the desired level of flood protection, produces the highest environmental outputs, and yields the highest monetary net benefits. It is therefore designated as the NED and NEQ plan. It is supported and preferred by the non-Federal sponsor. Alternative 12 is estimated to cost about $18.3 Million and has a benefit-to-cost ratio of 1.2.

Alternative 12, where the creek banks are protected with the toe wall and vegetated riprap is expected to resemble the conditions depicted in the following digital photograph simulation. The section of the creek between Ortega and Bath Street Bridges is shown in these photos.



Existing Condition (August 2000):

Expected Future With-Project Appearance after Vegetation has established:

Environmental Impacts of the Recommended Plan

The feasibility report and the combined environmental document fully describe the environmental impacts and mitigation requirements for the recommended plan.

Short term less than significant impacts to water quality, air quality, noise conditions, and other resources are expected during construction and future maintenance activities. However, no change from the existing conditions is expected in the long term. Impacts to two Endangered Species; Steelhead and tidewater goby, could be avoided or minimized by suspending construction activities within flowing water between December to March, and by scheduling future maintenance activities between April and November. Short-term impact to the tidewater gobies during construction would be minimized to insignificant level by dewatering one side of the estuary at a time for construction activities. However, future maintenance is expected to have minimal incidental take of tidewater gobies, the scheduling of maintenance would instead avoid impacts to steelhead. The anticipated impacts to the aesthetics would be short term during the construction activities. In the long term, the improvements that are proposed in this project would enhance the aesthetic values along the project reach and nearby communities by the re-vegetation of creek banks and the creation of the habitat expansion zones with recreational features. This recreational feature would be added and paid for by the City of Santa Barbara. Impacts and mitigation measures for other resources are described in the Feasibility Report and the EIS/EIR.

Plan Implementation Requirements

The District Engineer's recommendation proposes to seek new Congressional Authorization for this project and de-authorize the project authorized by the Congress in 1998. In accordance with the Water Resources Development Act (WRDA) of 1986, as amended, flood control projects are typically cost shared on a 65%-35% basis with the cost for lands, easements, rights-of-way, relocations, and disposal sites (LERRDS) as non-Federal responsibility. For this project the sponsor's project share would reach the maximum 50% allowed by law. The expected project cost-sharing apportionment would be $9.1 Million for the SBCFC&WCD and $9.2 Million for the Corps. The difference is associated with cultural resources costs, which would be shared fully by the Corps.

SANTA BARBARA COUNTY STREAMS
LOWER MISSION CREEK FLOOD CONTROL
FEASIBILITY REPORT

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Exhibit 1. Regional Map
Exhibit 2. Location Map
Exhibit 3. Mission Creek Watershed Map
Exhibit 4. Laguna Channel Drainage Map
Exhibit 5. Mission Creek Floodplain Map
Exhibit 6. Mission Creek Floodplain Map 3400 cfs Project
Exhibit 7. Engineering Plans
Exhibit 8. Architectural Drawings
Exhibit 9. Letter of Support and Financial Capability

Environmental Impact Statement / Environmental Impact Report
(MAY BE FOUND FOLLOWING THE EXHIBITS)

LIST OF TECHNICAL APPENDICES
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Appendix A. Hydrology
Appendix B. Hydraulics
Appendix C. Economics
Appendix D. Real Estate
Appendix E. Design
Appendix F. Cost
Appendix G. Geotechnical

I. STUDY AUTHORITY

A. *Authority*

The Los Angeles District has been directed to perform feasibility level studies of flood control alternatives in the City of Santa Barbara, California as authorized by Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), which reads in part as follows:

> "Sec. 209. The Secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, . . . to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the following named localities [including]:
>
> All streams in Santa Barbara County, California, draining the Santa Ynez Mountains, except Santa Ynez River and tributaries."

B. *Local Sponsorship*

This Feasibility Study is cost shared on a 50/50 basis with the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD). The City of Santa Barbara has worked with SBCFC&WCD and the Corps during the study phase of this project. The SBCFC&WCD is expected to share the non-Federal cost of project implementation and would be the non-Federal Sponsor responsible for the items of local cooperation requirements.

II. STUDY PURPOSE AND SCOPE

A. *Study Purpose*

The purpose of this study is to investigate the feasibility of flood control along Lower Mission Creek in Santa Barbara, California. The City of Santa Barbara has experienced approximately 20 damaging floods since 1900. Urbanization over the course of the century has undoubtedly contributed to the increased runoff within the watershed. Unless some flood control precautions are taken within the watershed, the City would continue to sustain damages due to inadequate channel size and undersized bridges.

This Feasibility Study completes the planning process of formulating and evaluating the array of alternative plans identified in the reconnaissance study and additionally, alternatives developed during the feasibility study, and selects a plan that maximizes net economic benefits while addressing flood control, environmental restoration and other needs identified and defined throughout the planning process. The results presented in this report were developed in accordance with Federal water resources planning principles, guidelines, procedures, and policies.

B. *Study Scope*

The study is limited to approximately the last one mile of the creek, beginning just downstream of Canon Perdido Street to Cabrillo Boulevard bridge at the tidal estuary before the creek reaches the Pacific Ocean (See Exhibit 2, "Location Map" following the Main Report). The scope of this study includes engineering, economic, environmental, real estate, and other planning activities as necessary to define problems and needs, develop alternatives and evaluate potential benefits, impacts, and necessary mitigation requirements associated with flood control measures within the Lower Mission Creek Area. The study identifies the costs and benefits of necessary improvements related to flood control. The study also makes a determination of the Federal interest and whether potential solutions exist that are in concert with current policies and budgetary priorities. Due to the recency of the last Corps feasibility study, which indicated that

sediment detention measures are not economically feasible, no detention basin is being considered in this study.

The study was conducted in coordination with public agencies, organizations and concerned individuals within the realm of Federal participation as defined by law and current planning regulations. The study also includes analyses, documentation, and coordination to meet NEPA and CEQA requirements as well as other Federal and State laws, policies and guidelines. The analysis was accomplished for present (year 1999) and future (year 2050) conditions, with a base operational year of 2001.

C. Study and Report Process

This is the Final Feasibility Study Report and EIS/EIR. The Reconnaissance Study Report (November 1995) determined that the investigation should proceed further into the more detailed cost shared Feasibility Phase Study. While the Reconnaissance Study was fully Federally funded, the cost for this Feasibility Study is cost shared on a 50/50 basis with a non-Federal sponsor, Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD).

III. PRIOR STUDIES, REPORTS, AND EXISTING WATER PROJECTS

A. *Prior Studies and Reports*

The Corps of Engineers first studied the flood problem along Mission Creek in the late 1960's. At that time, an improvement plan was developed. The improvements consisted of: (1) a debris basin on Mission Creek just downstream from Foothill Road; (2) a concrete channel extending from the debris basin along Mission Creek to Oak Park just above U.S. Highway 101; (3) a covered concrete channel to divert flows under the U.S. Highway 101 freeway, Union Pacific Railroad and under Modoc Road to Las Positas Road in the adjoining Arroyo Burro drainage area; and (4) a concrete channel along Las Positas Road and Arroyo Burro Creek to the Pacific Ocean. The estimated cost of the plan was approximately $9.5 million in 1969 dollars (about $41.1 million in 1995 dollars) with a benefit cost ratio of 1.3.

At a public meeting held in Santa Barbara on June 12, 1969, community interests objected to the proposed plan on the basis that it was insensitive to environmental values, especially in the reach upstream from State Street and through Oak Park. The community objected to: (1) the destruction of trees and brush in and along the creek that serve as wildlife habitat, provide shade and have aesthetic values; (2) the substitution of a concrete channel for an aesthetic natural channel; (3) despoiling of the natural environment, beauty and ecology of the area which is enjoyed by residents and visitors (adults and children) alike; (4) the adverse impact on the facilities and natural setting of the Museum of Natural History; and (5) the impact on ground water recharge along Mission Creek. Community interests emphasized the need for keeping the Mission Creek channel upstream from State Street and in Oak Park in its natural state.

In the early 1970's, the Corps of Engineers conducted further studies in coordination with an Environmental Quality Advisory Board established by the City of Santa Barbara. The Corps of Engineers and the advisory board considered various alternatives but could not agree upon a solution to the flood problems along Mission Creek.

A *Flood Plain Information Report* covering streams in the City of Santa Barbara (including Mission Creek) was prepared in April 1975. This report delineated the overflow areas and presented hydraulic characteristics of the *standard project flood* and an *intermediate regional*

flood, whose peak discharge would have a one percent chance of being equaled or exceeded in any year (this flood is generally referred to as the 100-year flood event). This report did not propose solutions to the flood problem, but did supply a basis for the adoption of land use controls to guide flood plain development and thereby preclude increased flood loss problems.

A Flood Insurance Study covering streams in the City of Santa Barbara, including Mission Creek, was prepared in June 1978 for the Federal Insurance Administration. Flood Insurance Rate Maps were prepared in December 1978. The Study and Maps enabled the City of Santa Barbara to convert to the regular program of flood insurance by the Federal Insurance Administration and to aid local and regional planners in their efforts to promote sound land use and flood plain development. The Study was performed under the authority of the National Flood Insurance Act of 1968, as amended.

The floods of 1978 and 1980 reawakened interest in flood protection for Mission Creek. On April 1, 1980, the City Council of the City of Santa Barbara requested, by resolution, the resumption of Mission Creek flood control studies. They believed that a feasible plan could be developed through public participation and an examination of alternatives. The Santa Barbara County Board of Supervisors sitting as the Board of Directors of the Santa Barbara County Flood Control and Water Conservation District on April 21, 1980 passed a similar resolution.

The Corps of Engineers concluded a feasibility study in 1986 with several structural, non-structural and no-action alternatives considered. The alternative recommended in the study, referred to as the *Lower Mission Creek Project* was authorized by Congress in the Water Resources Development Act (WRDA) of 1988. Given the narrow right-of-way constraints and national economic development criteria, the fully concrete-lined channel project was widely accepted as the only feasible alternative for controlling flooding along Lower Mission Creek.

The Corps conducted sediment analysis studies between June 1990 and May 1993, which revealed that the project would not provide the authorized level of protection due to sedimentation problems at the channel outlet. Sedimentation and various environmental concerns prompted the Santa Barbara City Council and the County Board of Supervisors to commission a *Mission Creek Consensus Group*. The Consensus Group worked with the Corps of Engineers and the Santa Barbara County Flood Control District, and the City of Santa Barbara

to identify other alternatives to the flood control problem. The City contracted with Kennedy/Jenks Consultants to analyze the alternatives, the result of which is the Kennedy/Jenks final report entitled, "The Mission Creek Flood Control Project, Alternatives Analysis" (August 1994).

In July 1995, the City of Santa Barbara requested assistance from the Corps of Engineers under their Section 206 Program. The City requested that the Corps help the City mitigate flood losses in the Laguna Channel Watershed. Hydrologic and hydraulic analyses were conducted as part of the project. The results of the analyses can be found in *Laguna Channel, City of Santa Barbara, California, Section 206 - Special Study, Floodplain Management Services,* dated June 1997. Also as part of the City's request, the *Final Non-Structural Flood Proofing Study for the Laguna Channel Watershed, Santa Barbara, California*, prepared by Simons, Li & Associates, Inc. was completed in September 1997. This study suggested several different methods of flood proofing including installing temporary closures, raising existing structures, and constructing floodwalls around the structures in the floodplain.

Other Studies in the Area

Since the construction of Santa Barbara Harbor in 1928, both the Corps of Engineers and private engineering firms have conducted numerous studies on the expansion of the harbor, the problem of shoaling at the harbor entrance and related down beach erosion. The most current of these studies, "The Final Feasibility Report for Santa Barbara Harbor" (August 1993) determined the Federal interest to improve upon the shoaling problem and reviewed the City's desire to be responsible for maintenance dredging. Currently, the Corps of Engineers maintains the harbor and will continue to do so unless Congress approves the 1993 feasibility study and thereby, relinquishes dredging equipment and operations to the City. To date, no other harbor studies are being conducted which may impact the Mission Creek Feasibility Study.

Several authorities are conducting water supply studies in the Mission Creek area. The California Department of Water Resources (DWR), in conjunction with San Luis Obispo and Santa Barbara Counties, has constructed Phase II, Reaches 5 and 6 of the California Aqueduct Coastal Branch. The project was completed in July 1997. The Coastal Branch has the capability to deliver 47,816 acre-feet of water to the Central Coast annually.

The Bureau of Reclamation completed a study in 1990 to enlarge Lake Cachuma and bring Bradbury Dam into compliance with the Bureau of Reclamation's Safety of Dam Criteria. Bradbury Dam is under going seismic retrofitting; however, the extension of the California Aqueduct has minimized the need to enlarge Lake Cachuma for water supply needs. The Santa Barbara County Flood Control and Water Supply District is conducting several groundwater management plans to study water quality and water supply in Santa Barbara County. None of these water supply studies will impact the Lower Mission Creek Study. No other water supply studies are being conducted in Santa Barbara County.

Both the Corps of Engineers and private engineering firms have conducted studies of the Santa Barbara County coastline since the construction of Santa Barbara Harbor in 1928. In 1987, the Corps initiated the "Santa Barbara County Beach Erosion and Storm Damage Reduction Reconnaissance Study" to investigate beach erosion and property damage at the mouth Mission Creek (East Beach). The recommended alternatives included continuing the restoration of East Beach with material dredged from Santa Barbara Harbor and installing protective structures along Carpenteria City Beach. At the conclusion of the reconnaissance study in February 1990, the local sponsors were unable to cost share the feasibility study. To date, no further Federal actions to study the beach erosion problems in Santa Barbara County have been considered.

The City of Santa Barbara has established a certified Local Coastal Program governing land use and establishing Zoning Ordinances and Guidelines. The plan is based on numerous local studies, including "Water and Marine Resources, Local Coastal Program" City of Santa Barbara, 1978.

B. Existing Water Projects and Facilities

Existing flood control projects in the Mission Creek drainage area include two debris basins in the watershed areas of Mission and Rattlesnake Creeks and three reaches of lined channel in the City of Santa Barbara. Existing flood control projects in the Laguna Channel drainage area consist of three storm drain systems including the Victoria Street System, Laguna System and Quarantina System.

Mission and Rattlesnake Creek Debris Basins

In 1964, the Corps of Engineers constructed two emergency debris basins. One basin has 15,900 cubic yards of capacity and is located on Mission Creek just upstream from the Botanic Garden and about one mile upstream from Foothill Road. The second basin has a capacity of 8,300 cubic yards and is located on Rattlesnake Creek about 800 feet upstream from Los Canoas Road (about 1.1 miles upstream from the mouth of Rattlesnake Creek). The debris basins are estimated to be adequate for a slightly greater than a ten-year storm for the first year after a burn and between a 25-year and a 50-year storm for the fourth year after a burn. The differences in capacities is due to the fact that the debris load increases dramatically immediately after a burn. Once vegetation is re-established, probable debris load from any storm is reduced.

Mission Creek Channel Improvements

Three reaches of Mission Creek are concrete lined downstream from Oak Park: (1) a 0.3 mile concrete trapezoidal channel from Los Olivos Street to about Pedregosa Street; (2) a 0.8 mile concrete trapezoidal channel from Arrellaga Street to about Canon Perdido Street; and (3) a 0.1 mile rectangular section with a concrete bottom and stone walled sides located between the Union Pacific Railroad tracks and Chapala Street. The upper two reaches, which adjoin the U.S. Highway 101 Freeway, were built by the California Department of Transportation as part of two phases of freeway construction. The channel between Los Olivos and Pedregosa Streets was built in 1934 and the channel between Arrellaga and Canon Perdido Streets was built in 1964. It is estimated that the capacity of the two upper reaches is about 7,000 cubic feet per second, slightly less than a 100-year flood. The lowest reach of concrete channel has capacity of about 3,000 cubic feet per second.

Mission Creek Bank Stabilization

Many short reaches of Mission Creek are lined with piled stone, sacked concrete, gabions and pipe and wire revetment to prevent localized bank erosion and flooding. These protective efforts are fragmented and have limited capability to control flooding of adjacent residential and commercial developments. Bank stabilization efforts have also impacted the environmental value of Mission Creek in proportion to increased urbanization. This has caused a loss of native vegetation, the introduction of non-native vegetation, a reduction in riparian habitat, reduced habitat for fish, birds and wildlife, and overall deterioration of Mission Creek's aesthetic quality. Bank Stabilization efforts are expected to continue as redevelopment and erosion due to flooding occur.

IV. PLAN FORMULATION

A. *Location and Extent of Study Area*

Location of the Study Area

Mission Creek is located in the City of Santa Barbara, California. Exhibit 1. "Regional Map" shows the location to be approximately 100 miles northwest of the City of Los Angeles in the County of Santa Barbara. The study area is defined as the Lower Mission Creek watershed and the Laguna Channel drainage area. For the purposes of this study, the Lower Mission Creek area is defined as the last mile before the creek enters the Pacific Ocean. This area is shown on Exhibit 2. "Location Map". The Laguna Channel area being studied extends from De la Guerra Street to the Pacific Ocean. The Laguna Channel drainage area is considered part of the study area because a portion of the flood waters from Lower Mission Creek drain into the Laguna Channel drainage area. Thus, any improvements to Lower Mission Creek would also reduce the flooding problems in the Laguna Channel drainage area.

Drainage Basin Description

As discussed above, the study area includes both the Mission Creek watershed and the Laguna Channel watershed. Therefore, the following sections discuss the characteristics of each drainage area.

Mission Creek

The watershed of Mission Creek and its tributary, Rattlesnake Creek, is approximately 11.38 square miles. The watershed drains the southern slopes of the Santa Ynez Mountains and the urban area of Santa Barbara. Rattlesnake Creek joins Mission Creek above Foothill Road outside of the City. Exhibit 3. "Mission Creek Watershed Map" illustrates the drainage area for Mission and Rattlesnake Creeks.

The Santa Ynez Mountains create a narrow coastal zone in the Santa Barbara area. In fact, the rise of the creek in the mountainous area can be between 3000-3500 feet in 3 miles. Crest

elevations in the watershed reach heights of 3500 to 4000 feet above mean sea level. In these upper reaches, maximum slopes can be as much as 2600 feet per mile. Average gradients in the mountainous area are about 1000 feet per mile, which is a sharp contrast to the average alluvial plain gradients of 150 feet per mile in the lower reaches of the creek.

The lower portions of the Creek flow through the urbanized area of downtown Santa Barbara. In this lower reach, the creek parallels Highway 101 until it reaches Canon Perdido Street, where it turns to the east, and crosses Castillo, De la Guerra, Ortega, Bath, Cota, De la Vina, and Gutierrez Streets. The creek then crosses Highway 101, Montecito Street, Union Pacific Railroad tracks, Chapala Street, Mason Street, State Street, and Cabrillo Boulevard before entering the Pacific Ocean just east of Stearns Wharf.

The lower portions of Mission Creek experience perennial flow due to urban runoff. However, significant flow only occurs during and immediately after storm events. Extreme runoff events, such as those that occurred on January 10, 1995, generally are produced by intense rainfall over a short period of time. According to the recent hydrology studies, the 100-year peak flow rate for lower Mission Creek is 7,050 cfs.

Laguna Channel

The area, which drains into Laguna Channel, is bounded by Mission Creek on the west, Sycamore Creek on the north and east and the Pacific Ocean on the south. The upper reaches of the drainage area have a slope of about 300 feet per mile. The slope decreases to approximately 150 feet per mile as it approaches the Pacific Ocean. Exhibit 4. "Laguna Channel Drainage Map" shows the delineation of drainage area for the Laguna Channel.

The Laguna Channel drainage area incorporates the following three storm drain systems: Victoria Street system, the Laguna system and the Quarantina system. The Victoria system collects water from the drainage area and diverts it into Mission Creek upstream of the project reach; the other two systems outlet to the Pacific Ocean.

Physical Setting

The Santa Ynez Mountains are part of the east-west trending Transverse Range geologic province. In the Santa Barbara area, this province consists of complexly folded and faulted igneous rock and sedimentary rock underlain by a basement of igneous rock. Just outside the City of Santa Barbara, the Santa Ynez Mountains rise to heights of more than 4,000 feet. The Santa Barbara Channel west and south of the City extends at least 25 miles to the west to the Channel Islands.

Climate

Santa Barbara has a Mediterranean climate. Mediterranean climates are characterized by warm dry summers and cooler and relatively damp winters. Maximum temperatures during the summer average in the 70's (degrees Fahrenheit). Summer low temperatures average in the 50's to low 60's. During the winter months high temperatures average in the 60's, while the minimums are usually in the 30's and 40's. Average annual precipitation for the area is 18 inches at the airport and over 30 inches in the Santa Ynez Mountains. More than 90 percent of the average annual precipitation occurs between November and April.

B. Problems and Opportunities

Problems and opportunities were identified, defined and assessed through: coordination with local and regional agencies and the public, review of prior studies and reports and an analysis of engineering, environmental and economic effects. The assessment is based on existing and expected future conditions, as described in the following sections.

The following statements were developed for the formulation and evaluation of alternative plans for the Mission Creek Project Study Area. They are based on the identified problems and needs expressed by the local sponsor and residents in the study area throughout the planning process. The statement also reflects the Federal concern for improving national economic development and preserving environmental quality. Plans are being analyzed for a period of study of fifty years from the date of construction.

Problems

The primary problem affecting the lower Mission Creek study area is the threat of flooding to property, which affects the health, safety and well being of the residents of Santa Barbara. This is substantiated by flood records dating back to 1862. Records show that the area has suffered at least 20 considerable floods since 1900. Increased urbanization of the Santa Barbara area over the last century has contributed to increased runoff, and therefore, increased flooding frequencies.

Secondary problems within the study area have been identified as the environmental impacts of flooding, urbanization and bank stabilization. Specifically, individual bank stabilization and uncoordinated improvements to the creek have resulted in the removal of the native riparian community. These bank stabilization efforts have degraded the natural characteristics of the creek bottom by unconfined placement of concrete material found in numerous locations along the creek. Persistent non-native vegetation, especially giant reed, has invaded and overwhelmed the creek's environs because of the loss of riparian community. Inhospitable patchy bank treatments, and periodic maintenance is necessary, in part, to prevent further encroachment of those weedy species and subsequent loss of conveyance capacity. Other secondary problems include the negative effects on water quality as it relates to fish habitat and the establishment of migration barriers preventing fish from reaching primary spawning grounds.

Opportunities

An opportunity exists for improving the physical, emotional and economic health, safety and well being of floodplain residents by reducing flood damages for the City of Santa Barbara. The proposed alternatives would also afford the opportunity to contribute to the restoration of environmental quality, enhancement of fish and wildlife habitat, and preservation of cultural resources within the study area. The existing conditions of the creek bottom can be improved to facilitate migration of steelhead trout and improve the aquatic habitat for fish, amphibians, benthic invertebrates, and wading birds. An opportunity also exists to expand the estuarine environment near the lagoon, which could increase the habitat for an endangered species, the tidewater goby.

C. *Planning Objectives and Constraints*

Planning Objectives

The Federal objective of water and related land resources project planning is to contribute to the overall National Economic Development (NED). NED contributions include increases in the net value of the national output of goods and services, expressed in monetary units. NED contributions are consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable Executive Orders, and other Federal planning requirements.

The general objective of the Feasibility Study Phase is to complete the plan formulation process initiated in the Reconnaissance Study Phase by identifying the most cost-effective means of flood control in the City of Santa Barbara. The most cost-effective means is the plan that maximizes contributions to National Economic Development (the NED plan). Contributions to National Economic Development are the net benefits of a project; these are the total benefits minus the total costs. Notably, the NED plan is the plan that maximizes net benefits rather than maximizes the benefit/cost ratio. The Federal objective for the City of Santa Barbara is to alleviate the flooding problems and realize the opportunities stated above that relate to the output of goods and services and increased economic efficiency. In addition to meeting the criterion of economic efficiency, a federal project must also comply with the National Environmental Policy Act of 1969 (NEPA).

Specifically, the objectives of the Lower Mission Creek Feasibility Study are as follows:

Provide increased flood protection for the residents and businesses of Santa Barbara
Restore the major species of a native riparian community along the project reach
Remove and suppress invasive non-native vegetation and replace with native plants
Remove man-made construction materials along the creek bottom and restore to natural creek
Enhance the aquatic habitat by changing the streambed characteristics.

Planning Constraints

Physical, economic and environmental constraints were identified in the Reconnaissance Study to help formulate and evaluate possible flood control alternatives. No new constraints have been identified for the Feasibility Study. Therefore, the reconnaissance planning constraints were used to establish the framework for the Feasibility Study 's evaluation and selection of alternatives.

Physical

Encroachment by urban development has severely limited the area available for implementation of any flood control alternatives. In addition, any flood control alternative must be able to function while conveying substantial amounts of sediment or debris.

The residential and commercial developments along Mission Creek straddle the existing creek channel and in some cases encroach in the existing waterway. In general, adequate rights-of-way could be obtained at reasonable costs to construct a narrow channel; however, there is insufficient space for recreation trails, bike paths or green belts. The reach of creek downstream from Canon Perdido Street is especially constricted; right-of-way costs increase substantially for discharges in excess of a 20-year flood.

Due to the economic impacts associated with temporary closure and reconstruction of the State Street, Cabrillo Boulevard, and Bath Street bridges, they will not be considered for replacement as part of this study. Both the State Street and Bath Street bridges have recently been replaced; therefore, the design of the alternatives took into account the maximum conveyance capacity of the bridges.

Economic

The 1936 Flood Control Act (Public Law 49-738) established that the Federal Government could participate in flood control improvements if the benefits of the proposed action are in excess of the estimated costs. For an alternative to be recommended in this study, the net economic benefits must exceed the costs. Flood damage reduction benefits cannot be claimed for future

development subject to flooding by the 100-year flood and Executive Order 11988, "Floodplain Management", which prohibits Federal agencies from promoting floodplain development. Therefore, federal plans are based on present floodplain development and future non-floodplain development. The Economic Documentation details the procedure for determining net benefits for the alternatives evaluated in this study.

During the economic analysis performed for this study, it was determined that replacement of the State Street, Cabrillo Boulevard, and Bath Street Bridges would likely produce negative net benefits. These bridges are located in the busiest tourist spot in Santa Barbara. Their replacement would undoubtedly have a significant negative impact to the local economy and the tourist industry of Santa Barbara. Therefore, replacement or reconstruction of the three bridges was not considered in the formulation of alternative plans.

Environmental

Although the County and the City of Santa Barbara recognize the seriousness of the flood problem along Mission Creek, they are very sensitive to the creek's environmental and aesthetic values. Any proposed flood control improvements should not disrupt or significantly modify these existing values.

The Mission Creek estuary provides habitat for a wide variety of birds and animals. Of particular concern is the Tidewater Goby, a Federally Listed Endangered Species. The creek itself may also provide a migratory corridor for Steelhead Trout. East Beach, located near the estuary, provides habitat for the Western Snowy Plover, which is a Federally Listed Threatened Species. By keeping the exiting natural condition of the creek bottom (pervious), the proposed flood control improvements would avoid or minimize biological and aesthetic impacts.

D. Without-Project Conditions

The without-project condition is the condition expected to prevail if no action is taken. The without-project existing condition is based on the year 1999. The without-project, future condition for this study takes place in the year 2050.

Flood History

Historical records of floods along Mission Creek date back to 1862. Most historical data is qualitative; very little quantitative data is available. Records since 1900 show that floods occurred in the Santa Barbara County area in 1906, 1907, 1909, 1911, 1914, 1918, 1938, 1941, 1943, 1952, 1955, 1958, 1962, 1964, 1967, 1969, 1973, 1978, 1980, 1983, 1995 and 1998. Increasing urbanization of the watershed during the historical period has undoubtedly contributed to increased run-off. Continuous records of peak discharges are only available for the last 24 years. A stream gage station was established on Mission Creek in October 1971. A stream gage was established in 1941 on San Jose Creek, draining a similarly sized watershed ten miles to the west of Mission Creek. Flood damage surveys have been conducted since 1969, but even these surveys were not complete for several of the floods. Prior to 1969, the records are mostly from newspaper accounts, field investigations and eyewitness accounts.

The rainfalls that cause flooding in the Santa Barbara area are intense, local storms typical to the south coastal area of California. These floods are of a short duration, with extreme flooding lasting a few hours or less. Past floods in the cities and communities of Santa Barbara, Goleta, Montecito and Carpenteria have demonstrated that localized storms can cause substantial damages in one area while completely bypassing another. Thus, awareness and a record of major damages in the entire south coastal area are helpful in assessing the flood potential along Mission Creek.

Flooding through 1911

The flood of 1862 was reported to have produced very high stages; however, little data is available concerning their severity. Between 24 December 1861 and 31 January 1862, rains fell consistently for 5 weeks. This time was known locally as "the deluge." Ten miles to the west, the Goleta Slough was created by sediment filling what had previously been a salt water harbor used by ocean going vessels. Other areas in Southern California, such as the Santa Ana River, suffered their greatest known flooding (in terms of discharge).

Not much flooding of note or record occurred until 1906 when several feet of water inundated

areas below the railroad tracks between Anacapa and Chapala Streets (about four blocks). During the same flood, the Anapamu Street Bridge over Mission Creek was washed away.

The floods of January 1907 were the worst in the history of Santa Barbara County (according to the Morning Press, Santa Barbara, January 11, 1907) and stopped railroad service to Santa Barbara. The creek overflowed its banks inundating the low lots near the foot of State Street.

The floods of January 1909 resulted in conditions reported as "more serious than they had been in many years." The following account was reported in the Weekly Press (January 28, 1909). "Stores on lower State Street suffered from an overdose of water that flowed into these places from the overflowed Creek." Water was up to three feet over the sidewalks of several blocks along what are now Cabrillo Boulevard and Mason Street. Railroad travel out of the town was cut off and the water came down the Creek in what was reported as "regular waves." The Oak Park area was flooded for the "first time in memory." Some local residents commented that recent street improvements in that vicinity may have aggravated the flooding conditions.

Mission Creek overflowed its banks in a number of places and flooded commercial buildings to a depth of at least two feet during the flood of January 1911. All the stores and buildings below the railroad tracks were reported damaged. Below Yanonali Street, the flood levels were the highest in history, reportedly nearly two feet higher than before. The Rust garage, near the overflowed Mason Street Bridge, had over two feet of water on the floor and a home on Kimberly had six inches in the parlor. At Bastanchury's lemon packinghouse across the street, water stood at one time a foot and a half deep. Several families had to move just before daylight to save themselves. Bridges were saved by men removing floating debris. Water overflowed the State Street bridge for several hours, one time to a depth of two feet; sewerage water added to the floodwaters.

The Flood of 1914

The January 1914 flood was the most destructive flood of record. Information about this flood has been obtained from newspaper articles, unpublished County survey reports and personal interviews of witnesses by County Flood Control personnel (during the 1960's).

Mission Creek overflowed from State Street downstream, completely destroying highway bridges, a dozen homes and several commercial establishments. Many residential and commercial properties were damaged by debris-laden floodwaters that in some areas reached a depth of four feet. Two drowning were reported in a nearby Montecito drainage - Hot Springs Creek. At this time, the community of Goleta was flooded to a depth of more than two feet, many bridges were washed out and many acres of cultivated land were buried in sediment and debris. Crop losses were heavy.

On January 18th, a week before the greatest inundation, a rainstorm filled Mission Creek and flooded lower Chapala and State Streets with one to three feet of water. Damages expressed in newspaper accounts released during the floods often shrank into more modest proportions in post-flood discussion. Many hysteric accounts told of destruction not validated afterward. However, the flood was a most extraordinary event. Rainfall was reported at 9.36 inches in 48 hours, with four inches in two hours, and 4.5 inches in four hours in an afternoon following almost five inches of prior rainfall.

Families living in Mission Canyon behind the Mission were forced to abandon their homes as the torrents poured down the canyon. Vast quantities of sediment were deposited along the channel sides when water overflowed the channel. The Creek overflowed upstream of what is present day De la Vina Street sending a stream of water several hundred yards south of the main current. Water four feet deep reportedly rushed down Alamar Avenue through the Oak Park grocery and blacksmith shop. From this area the floodwaters spread through the Oak Park area until at one time it was 2,000 feet across in the vicinity of the Cottage Hospital. On Third Avenue (now Pueblo Street) near the Creek, two smaller buildings were twisted about and others in that area were flooded. According to eyewitness accounts (data gathered by the Santa Barbara County Flood Control and Water Conservation District in the 1960's), the floodwaters reached across to the west side of the railroad tracks as far as present day La Cumbre Junior High School. At Mission Street below Oak Park, the flood flows continued along the east side of the railroad and also spread out onto the west side along Mission Street. Streets mentioned in the newspaper accounts as flooded in this area included Oak Drive, San Pasqual Street and Modoc Road. The flows rushed down San Andres Street and joined Mission Creek in the vicinity of Micheltorena Street. Downstream from there bridges blocked with debris spread the waters widely.

The numerous newspaper accounts of flood depths and damages along the lower reaches of Mission Creek include the following:

- Flooding of many places on Canon Perdido Street,
- Damages to barns, outhouses and warehouses north of Ortega Street just below the De la Guerra Street Bridge,
- A row of houses swept away on Ortega Street by torrents from the blocked Ortega Street bridge,
- Three feet of water on De la Vina Street,
- Numerous buildings carried downstream or flooded in the vicinity of Bath, Ortega, Cota, De La Vina and Haley Streets,
- Two feet of water and debris (in the form of a mad torrent) swept over the Southern Pacific Railroad tracks,
- Erosion of what is now Cabrillo Boulevard into gullies as much as ten feet deep by The Mission Creek floodwaters,
- Rail and highway traffic severed for days.

Damages from the 1914 floods included damages to many of the bridges below Oak Park. Several bridges were almost completely or totally destroyed (Pedregosa, Valerio, Carrillo, Haley) while others suffered major damage (Ortega, Bath, Cota).

Mission Creek flooding from 1918 to 1983

The flood of March 1918 caused Mission Creek to overflow at Oak Park and resulted in flooding at the Southern Pacific railroad tracks. The lowermost section of the City was flooded locally in the vicinity of State Street.

The flood of March 1938 caused flooding at State Street. The floods of 1941 caused damages to public improvements within the City of Santa Barbara estimated at $30,000 (1941 dollars). There were reports of flooding and sediment deposition, but no estimate is available of damages to the other properties. This season was the wettest in the duration of rainfall records at Santa Barbara at that point in time. But peak flows appeared to have been less than those of many

earlier floods because rainfall was well distributed.

In January 1943, Mission Creek overflowed from De la Vina Street (near Alamar Avenue) to Haley Street (just upstream from U.S. Highway 101). Water, mud and debris flooded the business district at the Alamar Avenue intersection. Small bridges in the Oak Park district were under water, including the Junipero Street Bridge. Minor flood damage to business establishments occurred on the lowermost portions of State Street. Families were evacuated from the lower reaches of Mission Creek.

Mission Creek overflowed several times during three heavy storms between January 12 and 16, 1952. On January 12, 1952, Mission Creek flooded an estimated 50 homes. The west side -- Chino, Gillespie and Mission Streets -- also suffered flooding, possibly as a result of Mission Creek overflows. Nearly all the bridges were blocked off during the peak of the storm, as water was two to three feet over many of the bridges. The bridges were saved by crews removing debris.

Floodwaters entered homes in the Haley and De la Vina Street area. Many parked cars were damaged by silt-laden water up to three or four feet deep. City officials estimated thousands of tons of silt were deposited on the City streets (including the east side near Sycamore Creek). On January 15, Mission Creek again overflowed and caused additional flooding. A house and two garages near Gutierrez Street were washed away. Many bridges were barricaded because of threatening floodwaters including the De La Vina Street Bridge near Alamar Avenue. A storm survey report prepared for the County of Santa Barbara (April 10, 1952) indicated that, in terms of rainfall totals and duration, the 1952 storm was more intense than the 1911 and 1918 storms, but less intense than the 1914 and 1943 storms. The 1914 storm's one-day rainfall greatly exceeded the 1952 storm.

Goleta streams flooded hundreds of acres during this period. U.S. Highway 101 and the community of Goleta were mired in mud. At least 100 residents were evacuated. There was very little development at that time in Goleta Valley.

In September 1964, a fire burned an area in excess of 67,000 acres in the watershed areas above the City of Santa Barbara and the community of Montecito to the east of Santa Barbara. About 30,000 acres were located in the drainage areas on the south slope of the Santa Ynez Mountains,

with the balance of the burned area located in the Santa Ynez River drainage to the north. Recognizing the impending disastrous situation, Congress on October 7, 1964 authorized emergency flood control work for the Santa Barbara area at a Federal cost not to exceed $860,000. This was preventive emergency work. Work was initiated by the Corps of Engineers within one week of authorization of funds, at a total cost of $1,600,000; the County of Santa Barbara contributed nearly $750,000, mostly for rights-of-way and bridge and utility relocations. In the Mission Creek area, two debris basins were constructed - one on Mission Creek with a capacity of 15,900 cubic yards and the other on Rattlesnake Creek with a capacity of 8,300 cubic yards and 4.6 miles of channel were cleared, shaped and revetted, on a temporary basis.

In November 1964, a minor flood caused damage estimated at about $500,000 (1964 dollars) mostly in the Montecito area. During that flood, boulders moved down the streambeds and, together with residue and debris, plugged bridges and obliterated stream channels, causing mudflows over several residential areas. The emergency work prevented substantial additional damages. Very minor damages were reported along Mission Creek; clearing of the channel and some bank protection work was needed.

The January 1967 flood caused moderate to major damage along the lower reaches of Mission Creek, from the Haley Street Bridge, about a quarter mile upstream of U.S. Highway 101, to the Pacific Ocean. Damages for this flood are presented in a *Flood Damage Report for Santa Barbara and Vicinity (December 1966 and January 1967 Floods)*, prepared by the Corps of Engineers in March 1967. This report cited the lack of adequate channel cross-section and bridge openings as reasons for the overflow. The major flood damage occurred along a reach just downstream from Haley Street where many residential and commercial establishments were damaged by debris-laden waters. Considerable debris was deposited on the streets and along the Southern Pacific railroad tracks. Highway traffic was interrupted and rerouted for a period of about two hours until the flood subsided and debris was removed from the highway. Numerous homes on the west side of Mission Creek were flooded and several of the large motels on the ocean frontage were damaged by the flood flow. Many of the establishments along both the ocean frontage and on other streets prevented excess flood damage by sandbagging entrances to their place of business. Heavy deposition of mud occurred in the streets. Bank erosion was severe and several short reaches of creek bank, 100 to 200 feet in length, sloughed off. A minor overflow occurred in the Vicinity of Oak Park and some minor bank protection was lost. It was

estimated that approximately 10,000 cubic yards of debris was trapped in the emergency debris basin on Mission Creek and approximately 4,000 cubic yards in the emergency basin in Rattlesnake Canyon. Damages along Mission Creek were estimated at about $683,000 (1995 dollars). Flooding was much more severe in Goleta Valley. Damage resulted from flooding and heavy deposition of debris on agricultural lands, the airport, streets and commercial and residential properties. Many families were evacuated from low areas where floodwaters reached a depth of about three feet. Passenger and freight trains of the Southern Pacific Company were delayed several hours due to a washout of 850 feet of track, and freeway traffic on U.S. Highway 101 was delayed due to flooding and the required removal of debris from the roadways. Total damage in the Goleta area was estimated at $3,458,000 (1995 dollars).

The January 1969 flood caused only limited damages along Mission Creek. Waters were essentially confined within the channel banks, except at Oak Park, where a small section of the park was flooded. Damages in the Montecito and Carpenteria areas were much more severe during the January and February 1969 floods. Heavy debris flows blocked bridges and obliterated streams in the foothill areas. About 100 homes in the Montecito area and 250 homes and 21 commercial establishments in the Carpenteria area were damaged.

The February-March 1978 floods along Mission Creek required repairs to the channel and removal of debris from the channel at a total cost of $130,000 (1995 dollars). Total utility damages in the City of Santa Barbara amounted to $24,000 (1995 dollars); however, these damages included areas outside of Mission Creek. Overflows near the U.S. Highway 101 crossing flooded in and around 50 structures; damages were limited by the fact that most of the houses are elevated a few feet above grade. Businesses in the area prevented damages by sandbagging. Cost of street cleanup amounted to $3,250 (1995 dollars).

The February 1980 flood along Mission Creek required channel repair at a cost of $241,500 (1995 dollars). Houses between Cota Street and Cottage Grove Avenue on De la Vina Street were flooded. Water was up to the crawl spaces on Gutierrez Street. Water left the channel further upstream on Islay Street and damaged the pipe and wire bank protection. Among the bridges overtopped were the Haley and Chapala Street bridges.

The 1983 floods along lower Mission Creek caused erosion to the banks from Ortega to Haley

Streets. Emergency riprap was placed along the channel to protect several threatened houses. The Mason Street Bridge blocked and diverted floodwaters away from the creek along Mason Street. More than a foot of water above the curbs in the vicinity of the Mason Street Bridge was reported by an eyewitness.

Floods of 1995

On January 10, 1995, Mission Creek overflowed its banks, inundating a narrow strip of the residential area along the creek above Highway 101, as well as most of the floodplain between Highway 101 and the Pacific Ocean. The watershed was saturated as a result of a series of storms delivering measurable precipitation over each of the preceding 10 days. January 10th eight-hour duration rainfall totals for the gauges near the Mission Creek drainage area show a range of values from a low of 5.59 inches to a high of 7.42 inches. A comparison of gauge totals from the January 25, 1969 storm shows values ranging from 2.64 inches to 6.57 inches.

While the watershed was saturated, flooding was less damaging than it might have been for two reasons. First, it has been 30 years since the last major burn in the Mission Creek watershed. While this factor would have greatly reduced the sediment delivered by the flood, and accounted for the lack of debris flows, most of the area of inundation was still covered with fine sediments to an average depth of approximately 1 foot. In addition, sediment delivered by the creek to the harbor was deposited in the vicinity of Stearns Wharf, necessitating emergency dredging to maintain sufficient depth to allow fireboats to approach the Wharf.

The second factor, which lessened the potential impact of the flood, was that the peak flows, as recorded by the U.S.G.S. gauge near Mission Street Bridge, occurred several hours after high tide. Had these peaks coincided with a rising tide, flood depths would have been much more damaging.

The extent of the flooding in Santa Barbara, primarily from Mission Creek, as well as flooding in neighboring Goleta, led to Santa Barbara County being included in a Presidential Disaster Declaration. Emergency floodfighting, clean-up and repair costs associated with Mission Creek flooding are estimated at $4,611,300, based on applications for FEMA assistance provided by the City of Santa Barbara. The approximate area of inundation is shown on a map prepared by the

City (See Plate 4). The peak discharge associated with this flood, 5,120 cubic feet per second, equates to a 50-year flood. Extensive sediment deposition occurred in the open area around the train station, as well as at the intersection of Bath and Ortega Streets.
The magnitude of the flood (50 year) is significantly less than the magnitudes associated with some of the reported precipitation rates. It is important to remember that a variety of factors influence the flood produced by a given storm. In addition to the basin's ability to absorb rainfall, the intensity, duration and distribution (aerial coverage) of the rainfall are all factors, which determine the runoff produced. For example, while some gauges may have recorded precipitation rates significantly greater than 50 year, the rate of precipitation may have varied greatly from one location in the drainage area to another. Also, during this event, there was a channel breakout at Oak Park, upstream of the gaging station, which could have contributed to the reduced peak at the gage.

Local media reported 600 people evacuated and train service was interrupted for several days as track beds had to be restored. As many as 300 homes were estimated to have been damaged, not all within the Mission Creek floodplain. During the flood event, the underpasses providing access across Highway 101 were flooded, with the State Street underpass flooded to overflowing. High water marks indicated overflow depths in excess of three feet and many businesses between Highway 101 and the ocean were still cleaning out debris two days later when the Study Team surveyed the flooded area.

Emergency dredging of the Mission Creek and Rattlesnake Creek debris basins was conducted by the Corps under tasking from FEMA. The total volume of material removed was 3,573 cubic yards from Mission Creek Basin and 7,590 cubic yards from Rattlesnake Basin. The amount taken from Rattlesnake Creek basin, approximately 90% of design capacity is of particular note as the County Flood Control District had the basin dredged to near capacity prior to the start of the 1994/1995 flood season.

Storms on March 10, 1995 caused substantial damages on neighboring watersheds and within the Lower Mission Creek watershed. Damages for the watershed were reported by the City of Santa Barbara to be in the range of $5 million.

Floods of 1998

Once again in 1998, the citizens of Santa Barbara were faced with flooding as Mission Creek overflowed its banks near the railroad tracks. Although there was no major damage due to breakouts, the City did experience nuisance flooding, transportation delays, and inconveniences. Bank erosion resulted in several areas where existing bank protection was inadequate to convey even the small magnitude floods such as the results of the 1998 storm events. The February 1998 storm, however, verified the previous estimates of the non-damaging capacity of the creek, subsequent to the creek being cleared of debris and outgrowth. The Corps of Engineers and the Santa Barbara County Flood Control District performed emergency clean-up work to remove deposited debris in the Mission Canyon and Rattlesnake debris basins at a cost of $1.2 Million. The United States Geological Survey stream gage at Mission Street indicated that the February 23, 1998 flow measured 1960 cfs. The following photos along State Street and Yanonali Street show some of the flooding that took place during the storm.

Summary

There are many accounts of one to two feet or more of flooding along lower Mission Creek, especially between 1906 and 1918. As the recent flooding shows, the same storms today result in more floodwaters due to urbanization of the lower watershed and flood plain, and light to moderate development of the middle watershed. More pavement, roofs, concrete and drains in both the middle and lower drainage areas have greatly increased potential for substantial runoff

since the early 1900's. Despite current setback requirements more residual encroachment exists than during the early 1900's. Many bridges and channel reaches still have very limited capacities; several can pass only storm flows with occurrence frequencies ranging from less than two to ten years.

Hydrology

The mean seasonal precipitation for the drainage area is approximately 18 inches along the coast and 30 inches in the mountains. The majority of the precipitation occurs between November and April. Flooding typically occurs between December and March. Occasionally, snow falls in the higher elevations of the Mission Creek watershed; however, the snow seldom remains more than a few days. The majority of the precipitation is a result of general winter storms that are associated with extra-tropical cyclones of North Pacific origin.

Exhibit 3. "Mission Creek Watershed Map" shows the delineated watershed and the flow concentration points. Exhibit 4. "Laguna Channel Drainage Area Map" shows the watershed boundaries and the three storm drain systems in the area.

There are two debris basins located upstream of the confluence of Mission and Rattlesnake Creeks. Due to their limited capacity, these structures do not significantly affect flood flows within the Mission Creek drainage area. They are the 15,900 cubic yard debris basin on Mission Creek and the 8,300 cubic yard debris basin on Rattlesnake Creek. There are several structures, which do affect runoff in the Laguna Channel area. These are storm drains serving the study area including Victoria Street System, Laguna System, and Quarantina System. The Victoria Street System diverts runoff from the Laguna Channel to Mission Creek. The two other systems outlet to the Pacific Ocean. The overflow analysis for the hydrology study accounted for the capacity of the storm drains systems.

Although previous discharge-frequency analyses have been completed using n-year rainfall runoff modeling, a new analytical analysis was performed for this study. The analysis utilized records for the Mission Street gage (29 years of record) and 46 years of historical information to estimate discharge-frequency values. Basin "n" values used in the 100-year rainfall-runoff model ranged from 0.05 in the mountains to 0.02 in the coastal urbanized area. Loss rates were

saturated loss rates of 0.2 inches per hour for all sub areas, which were adjusted to include impervious cover for each sub area.

The statistical analytical model yielded a median probability 100-year peak discharge of 7,050 cfs. Table 1, "Median Probability Peak Discharges, Mission Creek, presents the results of the current hydrology study on Mission Creek.

Table 1. Median Probability Peak Discharges, Mission Creek

Concentration Point	Drainage Area (mi^2)	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
6	7.87	1,400	2,200	3,700	5,100	6,900	12,500
USGS Gage	8.38	1,450	2,300	3,800	5,200	7,050	12,900
7	8.74	1,450	2,300	3,800	5,200	7,050	12,900
8	10.93	1,500	2,400	4,000	5,500	7,500	13,600
9	11.28	1,500	2,350	3,900	5,300	7,300	13,200

Because no stream flow records are available in the Laguna Channel Drainage Area, the Mission Creek model was used. The model produced a hydrograph with a 100-year peak flow rate of 2,550 cfs. The precipitation saturated loss rate of 0.20 inches per hours adjusted to account for 35% impervious cover was used in the modeling. A more detailed explanation of the area hydrology can be found in the "Hydrology Appendix" found under a separate cover "Technical Appendices" dated September 2000.

Hydraulics

The without-project condition hydraulics of Lower Mission Creek has been studied in several past Corps of Engineers reports. From those past studies, it was determined that flows greater than 5-year frequency overflows Mission Creek then travels eastward along the railroad tracks and reaches the Laguna Channel below the railroad tracks. Consequently, the Laguna Channel backs up and causes flooding in the Laguna Drainage area. By increasing the conveyance capacity of Lower Mission Creek, the backwater effect on Laguna Channel would be reduced. The previous studies also indicated that flood storage occurs for both Mission Creek and Laguna Channel. This ponding attenuates flows and affects water surface elevations. The past hydraulic studies used one-dimensional (1-D), steady state models.

This feasibility study used a two-dimensional (2-D) dynamic model to more accurately model the complicated flow patterns associated with both the Mission Creek and the Laguna Channel systems. The model was used to define the 25-, 50-, 100-, and 500-year floodplains. A detailed discussion of modeling analysis is presented as an attachment to the Hydraulics Appendix.

The new 2-D model refined the hydraulic capacity analysis and analyzed the commingling of flows from Mission Creek with the Laguna Drain system. The analysis revealed that the lowest Mission Creek channel capacity is 1500 cfs at Montecito Street Bridge. The 1500 cfs discharge corresponds to approximately a 5-year frequency event for Mission Creek. The channel capacity at this site was verified during the February 23, 1998 storm when the peak discharge of 1920 cfs overflowed the banks at this bridge.

As part of the modeling process, the 2-D model was calibrated using the January 10, 1995 storm. Once the model was calibrated, the floodplain boundaries for the 25-, 50-, 100-, and 500-year events were plotted. Exhibit 5. "Mission Creek Floodplain Map" shows the limits for flooding for both Mission Creek and Laguna Channel for the 25-, 50-, 100-, and 500-year storms. Average flood depths at each node of the 2-D analysis are presented in the Hydraulics Appendix, Plates 9 to 12. It is important to note that these depths are presented for informational purposes only. The results of the hydraulic analysis were used to determine annual damages, which are discussed in the Economics Section of the Without-Project chapter and in the Economic Appendix.

Geotechnical

The area surrounding the existing channel is composed of Quaternary non-marine and marine sediments varying in thickness from 600 to 800 feet, overlaying Tertiary non-marine and marine bedrock.

The non-marine sediments in the area are alluvium from the Santa Ynez Mountains. The most recent alluvial deposits, which are found in the streambed, tend to be poorly graded sands and gravels, with cobble up to 9-inches in diameter. These newer deposits can be classified as brown to reddish-brown sandy clay, clay, clayey sand, silty sand and occasional gravels. The older deposits are only encountered at depths near 30 feet and are mainly composed of sands and gravels. Both deposits range from medium dense to dense according to standard penetration test (SPT) data.

The marine sediments consist of lagoon, estuary, and beach deposits. Both the lagoon and estuary deposits consist of gray, blue-gray and black silty sands, clayey sands, sands, sandy clays, and, lean clays with organic odors. These deposits are found closest to the ocean. These marine deposits are overlaid by approximately 1 foot of poorly graded sands and gravels. Visual inspection of the beach deposits indicates that deposits are composed of fine to medium grained sand-silty sand.

No bedrock was encountered in the channel area. There are bedrock outcrops one mile to the west in the coastal bluffs, and on the southern edge of the Santa Ynez Mountains where Mission Creek flows onto the alluvial fan, about 2 2 miles north of the project area.

Mineral Resources

The predominant mineral resources in the vicinity of Santa Barbara are petroleum products. Asphalt deposits were first found in the area in the late 1700's. The deposits form a belt, which extends from Carpenteria to Point Conception. Both onshore and offshore oil and tar seeps have been discovered since 1792. Currently, most of the gas and oil production occurs offshore in the Santa Barbara Channel. In 1995, Santa Barbara County produced 4.7 million barrels of oil and 3 million cubic feet of gas. There are no mineral resources, mining, or petroleum production in the project area.

Seismicity

The project is located near two significant parallel faults, the Santa Ynez to the north, and the Mission Ridge-Arroyo Parida, to the south. Table 2, "Faults in the Vicinity of Mission Creek" list the faults surrounding the project site. All of the faults listed in Table 2 are believed to be potentially active.

Table 2. Faults in the Vicinity of Mission Creek

Fault Name	Distance to Project Site
Santa Ynez	5 to 6 miles north
Mission Ridge-Arroyo Parida	1 to 1.5 miles north
Lavigia	2.5 miles south-southwest
Mesa-Rincon Creek Fault	0.25 to 0.5 miles east
Montecito	1 to 2 miles northeast
Sycamore	1 to 2 miles northeast
Lagoon	1 to 2 miles northeast

There are at least 12 other faults offshore in the Santa Barbara Channel. These faults are located in the 25 miles between Santa Barbara and the northern Channel Islands. The faults are also considered active. Four other major faults are in the regional vicinity of the project. They are: (1) Big Pine; (2) San Andreas; (3) Santa Cruz Island-Santa Monica, and (4) Malibu-Anacapa-Pt. Dume Faults.

Over the last 96 years nineteen earthquakes with Magnitude 6.0 or greater have occurred within a 100-mile radius of the project site. The largest earthquakes known to have occurred in the Santa Barbara Channel faults was estimated to be Magnitude 7.0+. This earthquake, which occurred in 1823, was centered about 16 miles south and west of Mission Creek. The most recent event that caused measurable damage to the area was a Magnitude 6.8 earthquake in 1925 about 12 miles south of the project site within the Santa Barbara Channel. The closest 5.0+ Magnitude event occurred in August of 1978 and was located 3.25 miles southwest of the project area in the

channel. The event caused minor damage to both Goleta and Santa Barbara. This event produced a maximum acceleration of 0.21g at the Santa Barbara County Court House, which is located less than a mile from the project site.

Several of the active faults discussed in the previous paragraphs have the potential to produce significant bedrock accelerations at the site. A complete discussion of the potential seismicity in the area is included in the Geotechnical Appendix. The maximum expected bedrock acceleration of 0.5g could be produced by a 6.0 Magnitude event on the Mesa-Rincon Creek fault.

Groundwater

The project lies within the Santa Barbara Groundwater Basin. The basin has been divided into five aquifers: (1) the shallow aquifer, (2) upper producing aquifer, (3) middle aquifer, (4) lower producing aquifer, and (5) deep aquifer. The shallow aquifer varies in thickness from 200 to 300 feet and is not considered a source of good water due to pollution. Any water wells penetrating the shallow aquifer are usually cased.

Six test holes were drilled on the banks of the creek in the fall of 1990 for foundation studies. Four of the six wells were left as observation wells to monitor and further define the shallow ground water aquifer. The water level measurements indicate that groundwater from the shallow aquifer will be encountered during excavation of any project within the creek. Water generally stands all year long in Mission Creek from the railroad tracks and Highway 101 downstream to the Pacific Ocean. High ground water and tidal water will be encountered in this reach during construction.

Various studies on ground water recharge in the area indicate the improvements along the creek between Carrillo Street and the Pacific Ocean will have minimal effect on ground water recharge. Ground water recharge is discussed more extensively in the Geotechnical Appendix.

Real Estate

The project is located in the southwestern part of the City of Santa Barbara's downtown area. The area includes part of the downtown commercial area and part of an older residential area. The project area is approximately 2.35 acres. Above Highway 101, the study area is predominantly residential. The majority of the area consists of older, single family homes. The area does include a few newer multiple apartment dwellings as well as a few stores. Between the railroad plaza and Mason Street, there are several large, old houses, many of which have been converted into multiple apartment dwellings. A commercial area, with stores, hotel, restaurants and office buildings is located between Mason Street and Cabrillo Boulevard.

Mission Creek is not owned in fee or controlled by easements held by the city or county. Most of the creek is held by the property owners whose lots cross the creek. There are 73 lots in the study area, of which there are 63 different owners. Two lots are owned by the City of Santa Barbara and by the County. The owner of a foot wide piece of property is unknown. It is presumed that the property has been taken over by the adjacent property owners.

Santa Barbara County Flood Control and Water Conservation District has 22 easements and three small fee takings over properties where the creek flows. Most of the easements grant the District the right to construct, maintain and repair the flood control channel. These easements also include the right to remove debris, silt and vegetation. The total acreage of the easements is 1.59 acres, however only 0.32 acres of the easements extend into the creek bed.

The city ordinance on Watercourses and Storm Drain Systems, Chapter 14.56, deals with the definition of "Watercourse" and other matters such as obstructions, placement of fill, and placement of structures within the watercourse. There is no map, which officially delineates the watercourse along Lower Mission Creek; however, it is usually taken to be the top of bank. The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) shows that the creek above Gutierrez Street is designated as a large floodway.

No evidence of oil, gas or mineral deposits has been identified in the study area as part of the real estate investigation.

No relocations are being considered as part of the without-project conditions; however, some buildings are located in areas subject to flooding.

A survey conducted for the real estate investigation indicated that Southern California Edison, the Gas Company, GTE, and the City of Santa Barbara all have utilities within the project site. The Southern California Edison electrical lines are located overhead, and will not likely be affected by proposed plans for the creek. The Gas Company's subsurface pipes cross the creek through the bridges at De La Guerra, Ortega, Bath, Gutierrez, Montecito and Mason Streets. Relocation of gas lines at one or more of the crossings is likely. Most of the telephone lines are overhead, except for two locations were the cable crosses the creek by means of the Canon Perdido Street Bridge and the Cota Street Bridge. Water lines cross the creek at the following bridges: De la Guerra, Ortega, Bath, Cota, De la Vina, Gutierrez, Montecito, Yanonali, Chapala, Mason, and State Streets and Cabrillo Boulevard. One water line is located in the part of Castillo Street, which is just south of the Canon Perdido Street under-the-street telephone conduit. Sewer lines also meet at this location. A branch from the junction continues east to the properties on the south side of Canon Perdido Street. Other sewer lines run under the bridges at Ortega, Bath, De La Vina and Haley Streets, as well as Gutierrez Street and Mason Street. Due to its proximity to the creek, it is important to note that there is a 12-inch sewer pipe at the corner of Yanonali and Chapala Streets.

Economics

There are several types of damages identified in the economic analysis found in the Technical Appendix C. Damages were categorized as either being structural or nonstructural. Structural damages include damages to buildings and their contents within the Lower Mission Creek and Laguna Drainage Channel floodplains. Nonstructural damages include emergency repairs, cleanup costs, and transportation losses.

Flooding along Lower Mission Creek dates back to 1862. A list of historical flood and corresponding known damages in the Santa Barbara area is shown in Table 3, "Historical Flood Damages". The damages reported in Table 3 include damage to both structures and contents in 1999 dollars.

Table 3. Historical Flood Damages (1998 Price Levels)

Date of Flooding	Damages	Annual Exceedance
March, 1995	$5,557,000	9-year
January, 1995	$11,980,000	55-year
January, 1983	$1,872,000	10-year
February, 1978	$2,114,000	11-year
January, 1967	$3,979,000	NA

Source: City of Santa Barbara

For the purposes of this study, damages are expressed as annual values utilizing the fiscal year 2000 discount rate of 6 5/8 percent with a project life of 50 years. All benefits and costs are expressed at 1999 price levels with a base operational year of 2001.

Expected average annual damages to structures were calculated using the HEC-FDA (Hydraulic Engineering Center's Flood Damage Reduction) model. Expected annual structural damage (including risk and uncertainty analysis) in the Lower Mission Creek and Laguna Channel drainage areas are presented in Table 4. The risk and uncertainty analysis performed for this study essentially theoretically shifts structures within a reach or sub reach to a reference point, such as an identified hydraulics cross section, while maintaining the original flood dynamics at the location of the structure. The following variables were subject to risk and uncertainty for the determination of the stage/damage functions: first floor elevation, depreciated replacement cost, and water surface elevation. More information regarding the risk and uncertainty model parameters is located in the Economic Appendix.

Table 4. Expected Annual Without-Project Structural Damages

Type	Structural Damages ($1000)
Mission Creek Drainage Area	$1,884.7
Laguna Channel Drainage Area	$1,831.9
Total	$3,716.3

Annualized nonstructural damages include emergency repair costs, cleanup costs, and traffic delays. Emergency costs include the costs of evacuation, re-occupation, flood fighting, disaster relief, police, fire, medical, and governmental increases in operational costs. Cleanup costs include the costs of removing and disposing of sediment, which may cover streets, parking lots, and public property. Transportation losses in the form of local traffic disruption and railroad delays were also included in the nonstructural damages. Table 5 presents the results of the nonstructural expected annual damages.

Table 5. Expected Annual Without-Project Nonstructural Damages

Type	Expected Annual Damages ($1000)
Clean Up/Emergency/Bank Stabilization	$155.9
Exp. Transp. Damages	$19.2
Total	$175.1

* Annual Damages were Calculated by the Expected Annual Flood Damage Computation

Table 6 represents the summary of total expected annual without-project damages. The structural damages were calculated using risk and uncertainty as described in the Economics Appendix.

Table 6. Total Without Project Expected Annual Damages

Type	Expected Annual Damages
Structural (includes R&U)	$3,716.3
Nonstructural	$175.1
Total	**$3,891.4**

Environmental

A summary of the without-project environmental conditions of the study area and surroundings are discussed below. A detailed assessment may be found in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for Lower Mission Creek Flood Control Project, Santa Barbara, California following the main report.

Surface Water Quality

Water quality in the Lower Mission Creek area is affected primarily by inflows from mountain runoff and localized storm runoff. Common contaminants due to urban runoff include: oil and grease, lead, zinc, copper, pathogens, total suspended solids, and nutrients. A water quality study for the City of Santa Barbara has been completed, which specifically characterizes the contaminants found in the City's urban runoff. Santa Barbara, like many other southern California cities, typically experiences the highest pollutant loads in storm water runoff as a result of the first major storm of the year following the dry season. The lagoon at the outlet of Mission Creek has some specific water quality issues. The tidal lagoon tends to accumulate debris and stagnant creek water because the flow of water is often insufficient to clear the sand Aplug≅ at the outlet. Mission Creek has also been documented as a significant source of bacterial contamination to ocean water.

Ground Water Quality

The groundwater basin associated with Mission Creek includes the shallow zone, upper producing zone, middle zone, lower producing zone, and deep zone. The groundwater in the uppermost zone tends to be polluted in urban areas. Specifically, the shallow zone has high salinity. Increasing pumping rates in Santa Barbara have created the potential for saltwater intrusion into the water-producing aquifers near the coast. In the last 10 years, these wells have been capped or used only for monitoring purposes. The City replaced these wells with new wells drilled further inland. The City's groundwater management program has also been updated in such a way that the future potential to overdraft groundwater supplies is minimized.

Biological Resources

The following paragraphs discuss the biological resources within both the immediate study area and upstream reaches of the creek.

Vegetation - Vegetative cover in Lower Mission Creek is heavily influenced by commercial and residential development. Since the creek is maintained as a flood control channel, periodic maintenance in the form of mechanical scouring to remove vegetation, debris, and litter is used to maintain conveyance prior to the rainy season. This maintenance disturbs the natural habitat within the channel. On a September 1997 field visit, it was observed that some delicate aquatic vegetation appeared undisturbed despite the maintenance. Generally, plants on the side slopes of the channel have not been affected by the maintenance practices.

Some sparse riparian vegetation still exists within the creek. The native species that have been identified along this portion of the creek include: western sycamore (*Plantanus racemosa*), western cottonwood (*Poplulus frremontii*), and coast live oak (*Quercus agrifolia*). Of these three species, seven multiple trunk sycamores were observed, while only one cottonwood and one coast live oak were observed. Isolated willows (*Salix* sp.) grow at various locations along the channel banks. Willows do not constitute an important element of the existing riparian habitat.

Fish - The lower portion of the creek contains significant habitat for the Federally endangered fish species; the tidewater goby (Pices: Gobiidae). Also, Mission Creek is recognized as a migratory corridor for the Southern California steelhead (Pices: Salmonidae); another federally endangered species.

Amphibians - Four species of amphibians once likely inhabited the lower portions of Mission Creek. However, due to increased urbanization these species have been displaced. The four species likely displaced include: the red-legged frogs (*Rana aurora*), the foothill yellow-legged frog (*Rana boyleii*), the southwest arroyo toad (*Bufo microscaphus*), and the tiger salamander (*Ambystoma tigrinum*).

Birds - Two endangered bird species, Least Bell's vireo (*Vireo belli pusillius*) and southwest willow flycatcher (*Empidonax traillii extimus*), might rarely occur as transients in the areas. Several other birds and raptors may have inhabited the site at one time. The tidal lagoon may also occasionally support the following species: snowy plover (*Charadrius alexandrinus nivosus*), California least tern (*Sterna antillarum*), California brown pelican (*Pelecanus occidentalis californicus*), and peregrine falcons (*Falco peregrinus*).

Cultural Resources

Three archeological sites are located very close to the Area of Potential Effect (APE). The first is a prehistoric archeological site, CA-SBA-1958, the Twin Palms/Depot Park was recorded as a Alow-density chipped stone scatter and even lower density shell scatter. Site CA-SBA-27 located west of Mission Creek near Cabrillo Boulevard. SBA-27 was a habitation site with midden debris, house circles, and 11 burials. The third site, CA-SBA-28, previously known as Burton Mound, is the former Chumash village of Syukhtun. During excavation of the site, over 300 burials were discovered. Also, it is believed that as many as two tons of artifacts were shipped back to the Museum of Natural History in New York during the excavation.

Based on a recently completed study and subsequent coordination with State Historic Preservation Office (SHPO), several properties have been identified as eligible for listing on the National Register of Historic Places, which are found within or near the Area of Potential Effect (APE) for this study. These properties and resources are listed below:

- Pony Truss Bridge at Chapala and Yanonali Streets
- Mission Creek Diversion
- 20 West Mason Street
- 118 Chapala Street
- 120 Chapala Street
- 311-313 West Ortega Street

All structures eligible for the National Register are also eligible for inclusion on the California Register. Recent study results indicated that there are several properties and resources that may be eligible for listing on the California Register of Historic Resources or designation as a City Landmark or Structures of Merit within the APE for this study. These properties and resources are listed below:

- 15 West Mason Street
- 134 Chapala Street
- Potter Hotel Footbridge
- 434 De la Vina Street
- 306 West Ortega Street
- 101 State Street
- 116 Chapala Street
- 536 Bath Street
- West Downtown Neighborhood
- Waterfront Neighborhood

Hazardous, Toxic, and Radioactive Wastes

Mission Creek may contain Hazardous, Toxic, and Radioactive Wastes (HTRW). Forty LUFT (Leaking Underground Fuel Tanks) sites were reported as previously occurring within 1/2-mile of the centerline of Lower Mission Creek. Conversations with regulatory staff and review of available databases indicated that, with two significant exceptions, no obvious evidence of existing serious contamination from sites occurring within 1/2- mile of the centerline alignment of Lower Mission Creek were apparent. Several sites still have on-going remediation activities. Current status of the remaining LUFT sites is indicated in the following table.

The two exceptions mentioned above are considered serious situations by the Central Coast Regional Water Quality Control Board. These involve properties at 324 De la Vina Street and 220 West Gutierrez Street. The De La Vina property, which is currently owned by Caltrans, is known to be contaminated by perchlorethylene (PCE), a solvent used in the dry cleaning of fabrics. Cleanup of the site has been delayed partly due to legal proceeding involving the site at 220 West Gutierrez Street. The West Gutierrez Street site formerly had a large above ground tank in which PCE was stored for sale to the dry cleaning industry. The contaminant plume is reported to be migrating southeast toward the Caltrans site. The attorneys representing the property owner at 220 West Gutierrez Street are reportedly attempting to involve Caltrans in sharing the cost of remediation of the plume. It is likely that the threat of litigation has delayed the remediation of the Caltrans site.

Table 7. Recorded Leaking Underground Fuel Tanks

Facility ID No.	Site Description	Substance	Affected Media	Remediation Status
211	Santa Barbara Nissan 36 State Street	Gasoline	Other Groundwater	Post Remedial Monitoring
2093	Former 7-Up Bottling Plant 203 Chapala Street	Gasoline	Undefined	Case Closed
318	Courtesy Motors 527 Chapala Street	Gasoline	Municipal Aquifer	Undergoing Remediation
718	Firestone Tire 506 Chapala Street	Lube Oil	Undefined	Case Closed
270	Hughie's Auto 401 Chapala Street	Gasoline	Soil Only	Case Closed
2489	Hiete Property 414 Chapala Street	Gasoline	Undefined	Undergoing Remediation
5	Cal Trans 324 De la Vina	PCE	Shallow Groundwater	Legal Action Only
2506	403 De la Vina	Waste Oil	Undefined	Tank Closed Work Plan Requested 1994
2295	101 State Street	Diesel	Undefined	Site Assessment Phase
304	Chess Motors Inc. 118 State Street	Waste Oil	Shallow Groundwater	Tank Closed Classified as Low Risk Site
2	Paseo Nuevo Mall 651 Paseo Nuevo Street	PCE	Shallow Groundwater	Case Closed
2907	240 Montecito West	Gasoline	Shallow Groundwater	Case Closed

Noise

The source of most of the noise in the project area is truck, automobile and rail traffic. Generally speaking, noise levels increase as the creek progresses to the ocean. This increase in noise levels is due to the increase in traffic volume and tourist activities. According to a 1997 study, the noise levels within the project area range from 60 to 70 dBA.

Air

The air in Santa Barbara County does not meet the State and Federal standards for clean air. According to the 1995 Annual Air Quality Report, Federal or State standards are violated about 23 days per year. Typically, Santa Barbara has not met State or Federal standards for the following three pollutants: ozone, inhalable particulate matter (PM10), and hydrogen sulfide.

Recreation

The upper portions of Mission Creek above Oak Park are highly used for recreation. The more heavily urbanized lower portion of the creek is sometimes used for passive recreation such as hiking and bird watching. However, there are no parks in the West Downtown area. Several areas along the lower reach are visually and/or physically inaccessible. Chase Palm Park is located on the beach near the Mission Creek outlet. Facilities found at the park include soccer fields and a craft center. The beach area adjacent to the outlet is a widely used recreational facility.

E. Future Without Project Conditions

Since the completion of the Reconnaissance Study in November of 1995 there have been several new structures built along the project reach. Reconstruction of Bath Street Bridge was completed in 1996 and a new office building was built on Kimberly Avenue adjacent to the creek between Yanonali Street and Mason Street. Improvements to the Santa Barbara Train Station have been completed, including a new passenger platform. After the flood events of 1995 and 1998, property owners adjoining the creek who sustained bank erosion damages have constructed

different bank stabilization measures to repair or reclaim the lost property. These stabilization measures include the use of concrete placed in sacks (sack-crete), riprap, pipes and gabions. Some properties have not been stabilized and are continuing to sustain erosion damage.

Future without project conditions will be affected by bridge replacements, continued creek revetment and maintenance of the creek. It is expected that individual property owners will continue to build several types of bank stabilization measures to protect or reclaim property damage after any future damaging flood events. Also, routine maintenance for the channel and the bridges is expected to continue at its current rate in the future. A significant impact on future without project conditions is the scheduled replacement of the De La Vina- Haley Bridge prior to project implementation.

Although significant potential for redevelopment and infill exists, no change in the future without project floodplain inventory was projected in this analysis. New construction in the floodplain was not factored in to the without project damage analysis as existing City Floodplain Management Ordinances require first floor elevations of new construction to be above the base flood elevation. The potential exists for an event severe enough to fill in portions of the existing channel. It is assumed that, following such an event, the existing channel would be reestablished since development in the area precludes allowing the creek to establish a new channel. No other significant changes from the current without project conditions are anticipated.

F. *Formulation of Alternative Plans*

The process of plan formulation in this study dates back to 1969. Since that time, a multitude of flood control alternatives for Lower Mission Creek have been identified. As the plan formulation process evolved, it has become evident that local concerns over sedimentation, environmental and real estate impacts are paramount issues in the development of alternative plans. The following sections discuss the evolution of the alternative plans beginning with the plan proposed in 1969 and concluding with the plans currently proposed in this Feasibility Study.

Early Plan Formulation

The formulation of alternative plans for Lower Mission Creek has been an iterative process dating back to the first Corps of Engineer's improvement plan in 1969. The 1969 improvement plan included (1) a debris basin just downstream from Foothill Road; (2) a concrete lined channel from the debris basin to Oak Park (just above Highway 101); (3) a covered concrete channel to divert flows under Highway 101, Southern (now Union) Pacific Railroad and under Modoc Road to Las Positas Road in the adjacent Arroyo Burro drainage area; and (4) a concrete channel along Las Positas Road and Arroyo Burro Creek to the Pacific Ocean. This plan was rejected by the local community on the basis that it was environmentally insensitive.

In the early 1970's, the Corps continued their Mission Creek studies in conjunction with an Environmental Quality Advisory Board of the City of Santa Barbara. This effort considered various alternatives, but no conclusions were reached.

The floods of 1978 and 1980 revived local interests in flood protection along Mission Creek. This revival led both the City Council of Santa Barbara and the Board of Directors of the Santa Barbara County Flood Control and Water Conservation District to pass resolutions requesting the Corps to find a feasible solution to the flooding problems along Mission Creek. In response to those resolutions, the Corps of Engineers completed a Feasibility Study in 1986, which included structural, non-structural, and no-action alternatives. The alternative recommended in the 1986 feasibility study, referred to as the *Lower Mission Creek Project*, was authorized by Congress.

Sediment analysis conducted by the Corps in the early 1990's revealed that the proposed project was not feasible due to sedimentation problems at the channel outlet. Concerns over sedimentation and environmental impacts led to the City's establishment of the *Mission Creek Consensus Group*. The Consensus group included the members of the County Board of Supervisors, and the City Council, as well as representatives of affected property owners, environmental groups and the community. The Group worked together with the Corps of Engineers, the Santa Barbara Flood Control District and the City of Santa Barbara to formulate additional flood control alternatives. The city contracted with Kennedy/Jenks Consultants to analyze alternatives in *The Mission Creek Flood Control Project, Alternatives Analysis*, dated August 1994. The Consensus Group worked together for over a year to develop and analyze possible alternatives that would be acceptable to them and to the community. At the conclusion of the analysis, the Consensus Group made the following recommendation:

> *25-year flood protection (3210 CFS) with one half horizontal to one vertical (0.5:1) vegetated stabilized sloped banks along the entire project reach with allowance for vertical walls under bridges and at other points of constraint due to buildings or other right-of-way considerations.*

The recommendation was accepted on a 7-1 vote. It was further explained that Avegetated stabilized banks may be constructed with any combination of the following treatments: stepped walls, partial walls, various reinforced earth treatments and gabions. The Consensus Group also indicated that other alternatives should be considered. These included alternatives very similar to the recommended alternative, except that vertical walls would be allowed to be predominant south of the freeway with allowance for sloped banks where right-of-way allows a more natural treatment. Another alternative consideration was full 100-year flood protection; however, this alternative was ranked substantially lower than the other alternatives to be considered.

Reconnaissance Phase Plan Formulation

The *Lower Mission Creek Reconnaissance Flood Control Study* dated November 1995 studied some of the alternatives from the Kennedy/Jenks report. The Reconnaissance Report looked at several alternatives including non-structural, structural, and no-action alternatives.

Non-Structural Measures

The following non-structural measures were considered in the Reconnaissance Phase (1) flood plain management; (2) flood proofing; and (3) relocation.

The City of Santa Barbara has been a participant in the National Flood Insurance Program, which requires the City to maintain a Flood Plain Management Plan to reduce future flood plain hazards. The Reconnaissance Study also investigated the flood warning system and evacuation element of flood plain management. The study revealed that a flood warning system would be impractical to implement. Storm waters falling in the upper Mission Creek watershed reach the lower Mission Creek area in less than one hour, which would be too short a time for local residents to respond to any flood warning.

Flood proofing measures examined in the Reconnaissance Study include blocking flood water from entering a structure, jacking the first floor of a structure above a flood surface elevation, and constructing a flood wall or ring dike. Blocking the floodwaters at individual structures was not considered feasible due to likely failure of the structures' walls as a result of hydrostatic and hydrodynamic forces. Raising (jacking) structures above floodwater elevations was determined to be too expensive and uneconomical given the frequency of flooding in the area. Floodwalls or ring dikes were not considered a feasible alternative due to inadequate space, aesthetic considerations, and the difficulty in ensuring proper closure of openings in the wall or dike during a flood.

Finally, relocation of structures in the flood plain was considered. However, Santa Barbara is a highly developed area, which has very little space to relocate structures out of the floodplain.

Structural Measures

The Reconnaissance Study focused its structural measures plan formulation in three areas: (1) conveyance improvements; (2) diversion, and (3) environmental restoration.

Essentially, two conveyance improvement alternatives were developed in the Reconnaissance Phase. One Reconnaissance Study alternative would provide approximately a 25-year level of flood protection, as computed by creek hydrology at the time of the study, which corresponds to 3210 cfs conveyance and the other would provide 100-year level of flood protection 5800 cfs conveyance. The 3210 cfs conveyance alternative consisted of a natural bottom channel with vegetated stabilized sloped banks at a 0.5 to 1 slope and vertical walls. Gabions were proposed for the 0.5 to 1 slope upstream of Highway 101 and vertical walls were assumed to be the predominant bank treatment method downstream of Highway 101. The channel bottom width was assumed to be 30 feet with a top width of 40 to 45 feet. The alternative also included an open channel oxbow bypass, which would convey floodwaters downstream while using the oxbow for low flows. (See Exhibit 7. "Engineering Plans", Sheet 15 at the end of the Main Report). The 3210 cfs alternative required the demolition and reconstruction of seven bridges. The second conveyance improvement alternative, 5800 cfs, was developed directly from the Kennedy/Jenks Report. The 5800 cfs alternative is essentially the same as the 3210 cfs alternative with the exception of increased base widths to provide the additional capacity. The invert width would be 40 feet upstream of Cota Street and 50 feet downstream with corresponding top widths of 50 to 55 feet upstream of Cota Street and 60 to 65 feet downstream. In addition, the oxbow bypass would need to be expanded to a triple 8-by-16 box culvert. The Reconnaissance Study evaluation determined that both of the improved conveyance alternatives were economically viable alternatives. The study also determined that there was a potential for sediment transport to be a limiting factor in the 5800 cfs alternative based on observations during the January 10, 1995 flood. The Reconnaissance Guidance Memorandum (RGM) suggested that the feasibility study should be scoped to focus on the 3210 cfs and the 5800 cfs alternatives.

The diversion alternatives considered in the Reconnaissance Report focused on the construction of a diversion structure and accompanying culvert to divert 2000 cfs from a point just upstream of the Bath Street Bridge. Once flow was diverted from the main channel it would travel in a box culvert under Bath Street and outlet at the harbor. The diversion alternative was envisioned as a combination of the conveyance alternatives upstream of Highway 101 and the diversion downstream of Highway 101 with possible channel improvements to increase the downstream capacity to 5200 cfs. The Reconnaissance Study determined that the combination with the greatest net benefits was channel modifications upstream of Bath Street to provide 3210 cfs capacity in combination with the diversion. The Reconnaissance Guidance Memorandum (RGM) noted two areas of concern with respect to the diversion alternative cost estimate, the

dredge disposal and cultural resources mitigation. It was determined that based on the January 1995 storm, the diversion alternative would deliver increased sediment to the harbor. Also, there is likely to be a significant amount of cultural resources impacts associated with excavating along Bath Street. The costs associated with these impacts, while not quantified in the reconnaissance study, would significantly reduce net benefits. The RGM suggested that the diversion alternative not be carried forward into the feasibility study on the basis of significantly greater costs, local opposition, and net benefits which are significantly less than the non-diversion alternatives.

Environmental Restoration

The environmental restoration alternative considered three elements: (1) modification of the estuary to permit more frequent salt water penetration during low flow periods; (2) reestablishment of a riparian corridor along the creek; and (3) upstream improvements to facilitate salmonid migration. The RGM directed that a full range of environmental restoration alternatives be considered in the Feasibility Study.

Feasibility Phase Plan Formulation

The plan formulation efforts for the feasibility study began by examining the reconnaissance alternatives including the approximately 100-year level of protection, 5800 cfs, and the approximately 25-year level of protection, 3210 cfs, conveyance alternatives. Hydraulic modeling of the conveyance alternatives in this feasibility study determined that 5800 cfs conveyance was not obtainable due the bridge constraints at Bath, State Street, and Cabrillo Boulevard Bridges. Replacement of these bridges was considered; however, due to their location, replacement of the bridges was not economically feasible. The added costs of replacing these bridges would likely yield a benefit cost ratio less than unity.

After the record floods of 1995, new hydrology and hydraulic analysis determined that the highest conveyance achievable without replacing the three bridges was 3400 cfs, which corresponds to approximately a 20-year level of protection. Therefore, one of the conveyance alternatives studied in detail in this Feasibility Study is the 3400 cfs alternative.

A second conveyance alternative was developed for the feasibility phase: the 2500 cfs alternative. The objectives in formulating this alternative were to minimize required real estate take while replacing only the most undersized bridges.
Several different methods of bank protection are available for both alternatives. The Hydraulic Appendix discusses the different methods studied. Methods considered include natural bank protection, geotextile bank protection with natural channel bottom, riprap bank protection with natural channel bottom, grouted riprap bank protection with natural channel bottom, fully lined concrete channel, gabion-lined banks with natural channel bottom, and concrete-lined banks with natural channel bottom. The only bank protection methods studied in detail were the vegetated stepped wall, vegetated riprap banked channel, and the concrete-banked channel. All other methods were either not feasible due to right-of-way constraints or they were environmentally unacceptable. The proposed alternatives are discussed in the following section.

The previously authorized plan proposed to concrete line the channel. This design was found to be technically infeasible and did not have strong local community support. In response to public concerns, the Corps conducted a computer simulation and physical modeling at the Waterways Experiment Station (WES). The modeling revealed a fatal flaw in the sediment transport performance of the concrete channel. The flaw would render the channel unable to convey its design capacity. In September of 1993, the Corps informed Santa Barbara that the Lower Mission Creek Project was fatally flawed unless upstream sediment control could be provided. In addition, local opposition to the concrete channel project was strong due to project impacts on biological values and aesthetics, as well as safety concerns with high velocity flows.

In 1993, the tidewater goby, a resident fish of the estuary and the lagoon near the mouth was afforded federal protection under the Endangered Species Act (ESA). Also, resource agencies have identified Mission Creek as a prime migratory corridor for another Federally Endangered Species, the Southern California Steelhead. Implementation of a concrete lined channel for the entire reach, like the previously authorized plan, would result in adverse impacts to these Endangered Species.

Description of Alternative Plans

Twelve alternatives were evaluated in the Feasibility Study. The alternatives include the no action plan, a 2500 cfs capacity with two different channel configurations, and a 3400 cfs capacity with nine different channel configurations. Differences in channel configuration are due to the use of the oxbow-bypass and different combinations of bank protection. (See Exhibit 7. "Engineering Plans", Sheets 1 through 28 at the end of the Main Report). The following paragraphs describe each of the alternatives. Tables 8 and 9, "Alternative Plan Features" provides a summary of the configuration of each of the alternatives.

Maintenance of Alternatives 2 through 12

All of the alternatives require perpetual maintenance to assure design function and form. Therefore, maintenance of the alternatives is considered an integral part of each alternative. Weed and vegetation growth in the channel bottom will at a minimum require partial removal annually to maintain the design capacity. In addition, any areas where sediment deposition occurs will require the removal if more than fifteen percent of the channel capacity is plugged. It is estimated that the average frequency of this removal of plugs is a minimum of every three years. It is important to note that the channel may require maintenance more frequently than the minimum stated above.

Alternative No. 1*: No Action*

In this alternative, there is no change to the existing operating conditions. The residents and business owners in the Lower Mission Creek flood plain would continue to experience flood damage every few years.

Alternative No. 2 - *2500 cfs Capacity - Stabilized sides using combination vegetated stepped walls upstream of Highway 101 and vertical walls downstream of Highway 101*

This alternative would increase the channel capacity to 2500 cfs and would provide approximately a 15-year level of protection. The natural bottom would be maintained and would consist of stepped walls at 2:1 (V:H) slope above Highway 101. Below Highway 101, vertical walls would be the dominant bank treatment with stepped walls applied whenever practicable. The improved creek would generally follow the existing alignment. Six bridges along the study reach would be replaced including Ortega Street, Cota Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 3*: 2500 cfs Capacity - Stabilized sides using vertical walls*

This alternative is similar to Alternative 2 except that the sides would be stabilized using vertical walls throughout the length of the project. The same bridges as in Alternative 2 would need to be replaced.

Alternative No. 4*: 3400 cfs Capacity - Stabilized sides using vertical walls (no overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of concrete vertical walls throughout the project reach. The modified creek would generally follow the existing creek alignment. Seven bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 5*: 3400 cfs Capacity - Stabilized sides using vegetated stepped walls (no overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope throughout the study reach, except at the south end of the oxbow along the railroad tracks. The improved creek would

generally follow the existing creek alignment. Seven bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 6*: 3400 cfs Capacity - Stabilized sides using predominantly vegetated stepped wall with vertical walls applied for the remaining reaches (no overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope upstream of Highway 101. Below Highway 101, vegetated stepped walls would be applied along the southeast bank, starting from midway between the Chapala and Mason Street Bridges extending down to the State Street Bridge, and along the middle third of the southwest bank between Mason Street and State Street. Vertical walls would be maintained for the remainder of this reach. The improved creek would generally follow the existing creek alignment. Seven bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 7: 3400 cfs *Capacity - Stabilized sides using a combination of vegetated stepped walls and vertical walls (no overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained and would consist of stabilized banks at 2:1 (V:H) slope above Highway 101. Below Highway 101, vertical walls would be the dominant bank treatment. The improved creek would generally follow the existing creek alignment. Seven bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative No. 8*: 3400 cfs Capacity - Stabilized sides using vertical walls (with overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of concrete vertical walls throughout the project reach. This alternative would incorporate a new overflow culvert by passing the oxbow between just above Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing creek alignment except at the oxbow, which would be left in place functioning as a low flow channel. Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges.

Alternative No. 9*: 3400 cfs Capacity - Stabilized sides using vegetated stepped walls (with overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope throughout the study reach, except through the oxbow and the oxbow bypass. This alternative would incorporate a new culvert bypassing the oxbow between just above Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing creek alignment except at the oxbow, which would be left in place functioning as a low flow channel. Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, Gutierrez Street, and Mason Street Bridges.

Alternative No. 10*: 3400 cfs Capacity - Stabilized sides using predominantly vegetated stepped walls with vertical walls applied for the remaining reaches (with overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope upstream of Highway

101. Below Highway 101, vegetated stepped walls would be applied along the southeast bank, starting from midway between the Chapala and Mason Street Bridges extending to the State Street Bridge. Vertical walls would be maintained for the remainder of this reach. This alternative would incorporate a new culvert bypassing the oxbow between just above Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing creek alignment except at the oxbow, which would be left in place functioning as a low flow channel. Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges.

Alternative No. 11*: 3400 cfs Capacity -Stabilized sides using combination vegetated stepped walls upstream of Highway 101 and vertical walls downstream of Highway 101 (with overflow culvert)*

This alternative would increase the channel capacity to 3400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of vegetated stepped bank at a 2:1 (V:H) slope above Highway 101. Below Highway 101, vertical walls would be the dominant bank treatment with sloped bank treatment wherever practicable. This alternative would incorporate a new culvert bypassing the oxbow between just above Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing creek alignment except at the oxbow, which would be left in place functioning as a low flow channel. Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges.

Alternative No. 12: 3400 cfs Capacity With O*verflow Culvert - Stabilized sides using a combination toe wall and vegetated riprap slope and vertical walls*

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained and creek banks would consist of vertical walls and vegetated riprap sideslopes. The bottom half of the bank would consist of a short vertical wall while the upper half would be covered with vegetated riprap at a 1.5:1 (H:V) or flatter slope. The riprap would be covered with topsoil while concrete

pipes in varying sizes (up to a maximum of three feet in diameter) would be strategically placed in between the riprap to allow planting of native trees and vegetation.

Upstream of Highway 101, the toe wall-riprap sideslope would be the predominant bank treatment, except in two short reaches just upstream of the Haley-De la Vina and De La Guerra Street Bridges, where vertical walls would be maintained.

Downstream of Highway 101, between the Chapala and Mason Street Bridges, the toe wall-riprap sideslope would be applied along the left bank just upstream of Mason Street Bridge. The remainder of the banks would have vertical walls.

Below Mason Street Bridge, the toe wall-riprap sideslope would be applied along the left bank until about halfway to State Street Bridge where it would transition into a vertical wall down to State Street Bridge. The right bank would have vertical walls.

The remainder of the creek between the State Street and Cabrillo Boulevard Bridges would consist of the toe wall-riprap sideslope.

The improved creek would generally follow the existing alignment. It would incorporate an overflow culvert between Highway 101 and Chapala Street Bridge that would bypass the oxbow. The oxbow would be left in place to function as the low flow channel.

Four bridges along the study reach would be replaced including: Ortega Street, Cota Street, De la Vina Street, Chapala Street, and Mason Street Bridges.

Table 8. Alternative Plan Features

	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
I. Creek Length (ft)	5320	5320	5320	5320	5320	5320
II. Creek Bank Configuration						
Upstream of Oxbow	vertical/sloped	stepped	vertical	vertical	stepped	stepped
Along Oxbow	vertical	vertical	vertical	vertical	vertical	vertical
Downstream of Oxbow	vertical/sloped	vertical	vertical	vertical	stepped	stepped/vertical
III. Bank Protection						
Upstream of Oxbow	concrete, grouted stone, sackcrete, earth	vegetated step, concrete step wall	vertical concrete wall	vertical concrete wall	vegetated step, concrete step wall	vegetated step, concrete step wall
Along Oxbow	concrete, limestone, masonry	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall
Downstream of Oxbow	concrete, wood, piles, gabions, earth	vertical concrete wall	vertical concrete wall	vertical concrete wall	vegetated step, concrete step wall	vegetated step, concrete step wall/ vertical concrete wall
IV. Overflow Culvert	No	No	No	No	No	No
V. Bridges to be Replaced	0	6	6	7	7	7
Canon Perdido	No	No	No	No	No	No
De la Guerra	No	No	No	No	No	No
Ortega	No	Yes	Yes	Yes	Yes	Yes
Bath	No	No	No	No	No	No
Cota	No	Yes	Yes	Yes	Yes	Yes
De la Vina/Haley	No	No	No	Yes	Yes	Yes
Gutierrez	No	No	No	No	No	No
Montecito	No	Yes	Yes	Yes	Yes	Yes
UPRR	No	Yes	Yes	Yes	Yes	Yes
Chapala	No	Yes	Yes	Yes	Yes	Yes
Mason	No	Yes	Yes	Yes	Yes	Yes
State	No	No	No	No	No	No
Cabrillo	No	No	No	No	No	No
VI. Creek Top Width (ft)						
Cannon Perdido to De la Guerra	30-50	36	30	50	56	56
De la Guerra to Ortega	25-45	36	30	44	50	50
Oretega to Bath	25-35	36	30	44	50	50
Bath to Cota	40	36	30	44	50	50
Cota to De la Vina/Haley	25-40	36	30	44	50	50
De la Vina/Haley to Gutierrez	25-50	41	35	52	58	58
Gutierrez to Chapala (Box Culvert)	n/a	n/a	n/a	n/a	n/a	n/a
Gutierrez to Highway 101	40-50	46	40	47	53	53
Highway 101 to Montecito	40	46	40	60	60	60
Montecito to UPRR	35	46	40	60	60	60
UPRR to Chapala	35-40	46	40	60	60	60
Chapala to Mason	30-40	46	40	60	70	60-65
Mason to State	30-60	56	50	60	65-70	65-70
State to Cabrillo	60-70	60-70	60-70	60-70	60-70	60-70
VII. Conveyance Capacity (cfs)	1500	2500	2500	3400	3400	3400
VIII. Real Estate Acquisition						
Number of Parcels with Land Take Only	0	33	16	57	60	58
Number of Total Structure Take	0	2	1	9	13	11
Number of Partial Structure Take	0	3	3	7	7	7

Table 9. Alternative Plan Features

	Alt 7	Alt 8	Alt 9	Alt 10	Alt 11	Alt 12
I. Creek Length (ft)	5320	5320	5320	5320	5320	5320
II. Creek Bank Configuration						
Upstream of Oxbow	stepped	vertical	stepped	stepped	stepped	vertical/sloped
Along Oxbow	vertical	vertical	vertical	vertical	vertical	vertical
Downstream of Oxbow	vertical	vertical	stepped	stepped/vert	vertical	vertical/sloped
III. Bank Protection						
Upstream of Oxbow	vegetated step, concrete step wall	vertical concrete wall	vegetated step, concrete step wall	vegetated step, concrete step wall	vegetated step, concrete step wall	slopped riprap, lower concrete wall
Along Oxbow	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall	vertical concrete wall
Downstream of Oxbow	vertical concrete wall	vertical concrete wall	vegetated step, concrete step wall	vegetated step, concrete step wall/ vertical concrete wall	vertical concrete wall	slopped riprap, lower concrete wall
IV. Overflow Culvert	No	Yes	Yes	Yes	Yes	Yes
V. Bridges to be Replaced	7	4	4	4	4	4
Canon Perdido	No	No	No	No	No	No
De la Guerra	No	No	No	No	No	No
Ortega	Yes	Yes	Yes	Yes	Yes	Yes
Bath	No	No	No	No	No	No
Cota	Yes	Yes	Yes	Yes	Yes	Yes
De la Vina/Haley	Yes	Yes	Yes	Yes	Yes	Yes
Gutierrez	No	No	No	No	No	No
Montecito	Yes	No	No	No	No	No
UPRR	Yes	No	No	No	No	No
Chapala	Yes	No	No	No	No	No
Mason	Yes	Yes	Yes	Yes	Yes	Yes
State	No	No	No	No	No	No
Cabrillo	No	No	No	No	No	No
VI. Creek Top Width (ft)						
Cannon Perdido to De la Guerra	56	50	56	56	56	56
De la Guerra to Ortega	50	44	50	50	50	63
Ortega to Bath	50	44	50	50	50	63
Bath to Cota	50	44	50	50	50	53
Cota to De la Vina/Haley	50	44	50	50	50	53
De la Vina/Haley to Gutierrez	58	52	58	58	58	71
Gutierrez to Chapala (Box Culvert)	n/a	30	30	30	30	30
Gutierrez to Highway 101	53	47	53	53	53	71
Highway 101 to Montecito	60	existing	existing	existing	existing	existing
Montecito to UPRR	60	existing	existing	existing	existing	existing
UPRR to Chapala	60	existing	existing	existing	existing	existing
Chapala to Mason	60	60	70	60-65	60	60-71
Mason to State	60	60	65-70	65-70	60	60-71
State to Cabrillo	60-70	60-70	60-70	60-70	60-70	60-71
VII. Conveyance Capacity (cfs)	3400	3400	3400	3400	3400	3400
VIII. Real Estate Acquisition						
Number of Parcels with Land Take Only	62	57	58	57	57	50
Number of Total Structure Take	10	8	12	10	10	9
Number of Partial Structure Take	7	7	7	7	7	1

G. *Evaluation of Alternative Plans*

The alternatives described above are evaluated to determine their ability to meet the planning objectives and on how well they meet the following criteria:

- feasibility of modifications to creek,
- minimal environmental impacts,
- minimal real estate impacts,
- demonstration of federal interest based on economic and environmental criteria,
- support of the non-federal sponsor, and
- consistency with current policies and budgetary priorities.

Feasibility level engineering, economic, environmental, and real estate analysis was performed in order to identify the required channel modifications, costs of modifications, real estate requirements, environmental impacts and benefits resulting from flood protection. The following sections summarize information from the technical appendices that are part of this Feasibility Study.

Hydrology

There are no expected changes in hydrology between the without-project and the with-project conditions. Alternatives 2 and 3 would be designed to convey a flow of 2500 cfs, which corresponds to an approximately 15-year level of protection. Alternatives 4 through 12 would be designed to convey a flow of 3400 cfs, which corresponds to an approximately 20-year level of protection.

Hydraulics

Hydraulic engineering efforts associated with the Feasibility Study include: alternative plan formulation, hydraulic modeling, sediment budget analysis, and overflow analysis.

The hydraulics of Lower Mission Creek presented challenges in the flood plain plan formulation. In numerous locations, the capacity of the creek is constrained by the minimal capacity provided by bridge crossings. An HEC-RAS (Hydrologic Engineering Center - River Analysis System)

was used to model the proposed alternatives. Basically, the 3400 cfs capacity alternative (Alternatives 4-12) was modeled once with the following configuration: upstream of Highway 101 channel side slopes of 0.5 horizontal to 1 vertical with reinforced concrete stepped walls, downstream of Highway 101 channel side slopes would be vertical reinforced concrete walls, the entire creek bottom would remain natural, and an oxbow bypass would be used. This configuration corresponds to Alternative 11. The creekbed slope was assumed to be streamlined to improve conveyance. The following bridges were removed and assumed replaced with a clear span structure: Mason Street, Chapala Street, Union Pacific Rail Road, Montecito Street, Gutierrez Street, Cota Street, Ortega Street, and De la Guerra Street.

To aid in plan formulation, several other refinements were made to the model. Although detailed hydraulic computations were not completed, a qualitative analysis was completed for the widening of the oxbow instead of utilizing a bypass culvert. Under this configuration, the oxbow would be widened to 60 feet wide. The use of the widened oxbow instead of the bypass is included in Alternatives 4 through 7.

Further discussions during plan formulation resulted in additional analysis to determine if increasing the width of the Cabrillo Boulevard Bridge would help to increase the capacity of the State Street Bridge. The analysis revealed that the widening of Cabrillo Boulevard Bridge would not significantly increase the capacity of the State Street Bridge. In fact the widening of Cabrillo Boulevard bridge would likely force the water surface to critical depth at the downstream face of the State Street Bridge, which would likely generate higher flow velocities within an unstable flow regime, which in turn may undermine the State Street Bridge abutments.

One final adjustment was made to the 3400 cfs alternative. In the interest of reducing real estate costs with the proposed alternatives, the effects of narrowing the channel vertical walls between State and Mason Streets and between Ortega and Canon Perdido Streets was evaluated on a preliminary basis. The hydraulics analysis associated with the narrowing indicates that narrowing both stretches of creek to 50 feet in width is an acceptable configuration that could be used in the final design. Additional detailed analysis during the design phase will need to be completed to verify findings.

The 2500 cfs capacity alternative was also modeled using HEC-RAS. There are several design constraints associated with this alternative, most notably is the desire to keep real estate impacts to a minimum. For this alternative, only the following most under sized bridges where assumed

to be replaced: Mason Street, Chapala Street, Union Pacific Rail Road, Montecito Street, Cota Street, and Ortega Street. Refinement of the 2500 cfs model was needed to eliminate critical flow locations. The refinements indicated that a 25-foot-wide channel upstream of the highway is the optimum design for the 2500 cfs alternative.

Sediment Budget Analysis

A sediment budget level of analysis was performed for this phase of the Feasibility Study. Detailed information concerning the sediment budget analysis can be found in the Hydraulics Appendix. It is expected for both the 2500 cfs and the 3400 cfs alternative that there will be minimal bed elevation change in the upper reaches. The estimated overall bed change for the study reach for the with-project conditions is less than 1 foot, which is similar to existing conditions.

Effect on the Sediment Budget of the Harbor

Based on the sediment budget analysis, approximately 21 tons (9.2 cubic yards) and 25 tons (10 cubic yards) of sediment are transported to the Santa Barbara Harbor on an average annual basis for the existing and with-project, respectively. These numbers are negligible compared to the 25,000 cubic yards of material that are transported annually from East Beach to West Beach. Based on these results, the with-project conditions for both capacities should have no significant effects on the sediment budget of the harbor.

With-Project Overflow Analysis

The overflow analysis for the with-project alternatives was modeled using the same procedures as outlined in the *Without-Project Conditions Section*. Two different alternatives were evaluated in the overflow analysis. Both alternatives used the top-widths and bridge replacements per the 3400 cfs alternatives. One alternative considered using rough concrete and the other considered using gabions. The analysis revealed that there is not a significant difference between the two bank treatments. However, the rough concrete gives a slightly larger channel capacity due to lower Manning's values. The overflow analysis reveals significant improvements for the 3400 cfs alternative over the without-project conditions (See Exhibit 6 "Mission Creek Floodplain Map 3400 cfs Project").

A formal with-project overflow analysis was not completed for the 2500 cfs alternative. A simplified procedure was used to evaluate residual damages. The existing conditions overflow analysis results were modified by assuming that the channel will handle an extra 1000 cfs (2500 cfs minus 1500 cfs existing capacity), and subtracting the discharge from the overbank flows. Essentially the discharge-frequency curve was shifted. Therefore, a new discharge-frequency curve was calculated at each cross section while keeping the same water surface elevations.

The results of the overflow analysis were tabulated for use as the input of the HEC-FDA program. These input parameters were used to estimate residual damages as discussed in the *Plan Selection Section* of this report.

Geotechnical

The geotechnical evaluation of the with-project alternatives focuses on design requirements. The geotechnical design requirements for Alternatives 2 through 12 are similar and are discussed in the following paragraph.

The design values for the foundation and backfill materials for the alternatives should meet the criteria in Table 10.

Table 10. Mission Creek Design Values

Parameter	Value
Foundation Material	
Allowable Bearing Pressure	1500 psf
Permeability	85 fpd (fine sand)
Backfill Material	
Moist Unit Weight	125 pcf
Saturated Unit Weight	135 pcf
Angle of Internal Friction	20E
Cohesion	200 psf
Active Earth Pressure Coefficient	0.40
Equivalent Earth Fluid Weight	50 pcf
At-Rest Earth Pressure Coefficient	0.55
At-Rest Equivalent Earth Fluid Weight	70 pcf
Passive Pressure	250 pcf

Other requirements include the use of a subdrain system throughout the entire project length, construction slopes graded no steeper than 1 vertical to 2 horizontal, scour protection at footings, and liquefaction protection up to 0.15g seismic acceleration.

Design

Due to the constraints governing the design of the alternatives of minimal real-estate acquisition and the desire to maintain and create habitat conducive to Steelhead migration, all alternatives would consist of natural creek bottom. For Alternatives 2-7, the alignment of the modified channel would generally follow the existing alignment. For Alternatives 8-12, the alignment of the modified channel would follow the existing alignment except around Highway 101, where higher flows would be diverted into a pair of 15-foot-wide by 6-foot-high culvert.

Three types of channel walls were investigated: vertical concrete walls, concrete step walls, and riprap walls. Based on the input from public meetings held in the community, the public would like the local sponsor to consider using the riprap wall as much as possible.

The riprap bank treatment would be placed on top of a short vertical wall with a 1.0 vertical to 1 2 horizontal slope or flatter. The riprap thickness would be 15 inches. The riprap would be recessed and covered with a topsoil layer so that ground cover can be planted. Concrete pipe planters varying in sizes (up to a maximum of 3 feet in diameter) would be placed in between the riprap to allow for planting of native trees and vegetation.

The step wall would allow planting of riparian type vegetation half way up the wall. The idea is that as the vegetation matures, it would obscure the concrete walls to give the stream additional shading and aesthetic appeal. The disadvantage of the step wall is that it would require an increased channel width compared to the vertical wall design. The step walls considered would generally approximate a channel having 2 vertical to 1 horizontal sideslopes.

Preliminary designs were configured for Alternatives 2-12. Plan sheets 1 through 16 show the plan view for various alternatives. Sheets 17, 18, 19, and 20 show typical sections for each type of wall. The Engineering Plans as Exhibit 7 and the Architectural Drawings as Exhibit 8 can be found following the Main Report.

There are nine alternatives for the 3400 cfs capacity. The alternatives are various combinations of vertical walls, step walls, or vertical walls with sloped riprap backfill. Two alignments under Highway101 were considered either using the existing oxbow channel alignment or constructing a new oxbow bypass. The oxbow would carry flow up to its capacity, the rest would flow through the covered box channel. The box channel would be placed under Highway 101 through an existing 40-foot wide opening. The other alternative would widen the oxbow by moving the south side masonry channel wall 20 to the south to create a 60-foot wide channel and widen both the railroad bridge and the Montecito Street Bridge. The following is a list of alternatives for the 3400 cfs capacity and their corresponding plan sheets:

Alternative No. 4: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using vertical walls throughout the entire project reach. Plan sheets 1, 2, 3A, and 4.

Alternative No. 5: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using predominantly vegetated stepped walls throughout the entire project reach. Plan sheets 5, 6, 8, with 3A.

Alternative No. 6: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using vegetated stepped walls upstream of Highway 101 with mixed vertical walls and vegetated stepped walls applied downstream of Highway 101. Plan sheets 5, 6, 8A, with 3A.

Alternative No. 7: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using vegetated stepped walls upstream of Highway 101 and vertical walls downstream of Highway 101. Plan sheets 5, 6, 4, with 3A.

Alternative No. 8: 3400 CFS Capacity with Oxbow Bypass - Stabilized sides using vertical walls throughout the entire project reach. Plan sheets 1, 2, 3, and 4.

Alternative No. 9: 3400 CFS Capacity with Oxbow Bypass - Stabilized sides using predominantly vegetated stepped walls throughout the entire project reach. Plan sheets 5, 6, 7, and 8.

Alternative No. 10: 3400 CFS Capacity With Oxbow Bypass - Stabilized sides using vegetated stepped walls upstream of Highway 101 with mixed vertical walls and vegetated stepped walls applied downstream of Highway 101. Plan sheets 5, 6, 7, and 8A.

Alternative No. 11: 3400 CFS Capacity with Oxbow Bypass - Stabilized sides using vegetated stepped walls upstream of Highway 101 and vertical walls downstream of Highway 101. Plan sheets 5, 6, 7, and 4.

Alternative No. 12: 3400 CFS Capacity with Oxbow Bypass - Stabilized sides using predominantly combination vertical wall and riprap. Plan sheets 13, 14, 15, and 16.

The 2500 cfs alternative would extend through the same reach as the 3400 cfs alternative. The existing oxbow would be utilized under Highway 101. The railroad bridge and the Montecito Street Bridge would be widened. Listings of alternatives for 2500 cfs capacity channel and their corresponding plan sheets are as follows:

Alternative No. 2: 2500 CFS Capacity - Stabilized sides using combination vegetated stepped walls and vertical walls. Not shown.

Alternative No. 3: 2500 CFS Capacity - Stabilized sides using vertical walls throughout the entire project reach. Plan sheets 9 through 12.

Access Ramps and Fencing

Approximately four access ramps are to be designed as part of each alternative. The ramps would be designed to access the channel bottom for maintenance. The location of the access ramps are as proposed: (1) north side downstream of Canon Perdido Street with access from adjacent parking lot; (2) south side downstream of Bath Street with access from Cota Street; and (3) south side downstream of Gutierrez Street with access from De la Vina Street; and (4) east side downstream of Gutierrez Street Bridge near the inlet of the overflow culvert.

Due to the steep slopes of the proposed alternatives, channel fencing would be provided to meet safety requirements. Fencing is assumed to be 6 feet high chain link for draft cost estimate purposes. The actual fencing proposed for the design, which might include a simple 4 foot channel barrier or hand rail next to public right-of-way, would be determined during final design. The sponsor may desire to pay for upgraded fencing.

Retaining Wall Preliminary Design

Two types of wall footings were examined for all of the alternatives. The type of wall footing used would depend on adjacent real estate availability. In areas where adequate rights-of-way exist, an inverted "T" type cantilever wall footing would be used. In areas where there is limited right-of-way available, pile footings would be used. Two assumptions were made for the purposes of cost estimating: a scour depth of four feet was assumed and approximately half of the walls were considered to be cantilever footings.

Bridge Relocations and Replacements

For the 3400 cfs alternatives, Alternative 4-7 (without the oxbow bypass) would require the reconstruction of seven bridges as described in Table 8, "Alternative Plan Features," above. Alternatives 8-12 (with the oxbow bypass) would require the reconstruction of four bridges. Alternatives 2 and 3 (2500 cfs alternatives) would require the replacement of six bridges. Alternatives 2-7 would require the widening the existing railroad bridge and Alternatives 8-12 would require construction of the overflow culvert. The bridges are proposed to be either a precast reinforced concrete box, or a precast, prestressed girder on pile abutment configuration and all would be clear span design. Any final design and construction would minimize construction time and impacts to the railroad.

Construction

There are four major factors to be considered as part of the construction of the project: shoring requirements; access during construction; bridge relocation; and disposal. Because of the limited channel right-of-way, approximately 3600 lineal feet of shoring would be needed. The use of shoring is important because it significantly increases construction costs. Access during construction would need to be from within the channel. This restriction would eliminate the use of larger construction equipment such as excavators and cranes. The restriction would require the use of smaller equipment, which would result in above average construction time. The third construction factor is the phasing of the bridge replacements. Construction of the bridge replacements at the road crossings would need to be phased so that the adjacent road crossing can be used as a detour. Approximately 64,000 cubic yards of excess excavated material would need

to be disposed. A possible disposal site has been located 20 miles north of the site at a municipal landfill.

Operation and Maintenance

The modified creek would have structurally adequate bank protection. It is therefore reasonable to expect maintenance needs for the creek banks be reduced compared to existing needs. Currently, the lack of effective bank stabilization in most of the channel creates severe bank erosion during high flows. Since 1995, the local sponsor has spent $95,000 to stabilize eroded banks and $50,000 for channel clean-up and repair in addition to regular annual maintenance costs estimated at $10,000. The cost of channel bank stabilization and repair after flooding would be greatly reduced under the with-project condition. It is estimated that the annual maintenance costs of the structural components could be reduced by as much as one-third depending on the alternative selected. Both the step wall and the riprap wall alternatives would likely have a slightly higher initial annual maintenance cost than the vertical walls until the vegetation is well established with the riprap wall having the highest expected maintenance cost due to the need to replace some of the topsoil after a major flood event.

All alternatives would require some annual maintenance to maintain the design capacity of the channel. Weed and vegetation growth in the channel bottom would at a minimum require partial removal annually (using a mosaic pattern) to maintain the design capacity. In addition, any areas where sediment deposition occurs would require removal if more than fifteen percent of the channel capacity is plugged. It is estimated that the average frequency of this removal of plugs is a minimum of every three years. It is important to note that the channel may require maintenance more frequently than the minimum stated above.

Real Estate

The with-project real estate requirements are an integral part of the plan formulation and plan selection process. The following sections describe the real estate requirements for each of the alternatives formulated in this feasibility study. The properties that would be impacted for each alternative are indicated in the Exhibit 7. "Engineering Drawings" found after the Main Report.

Relocations under P.L. 91-646

Several residences and commercial buildings may be affected by the creek alignment under the with-project conditions. The residences may include 303 W. Ortega Street, 434 De la Vina Street, 631 Bath Street, 633 Bath Street, 129 W. Haley Street, 116 Chapala Street, 2 residences at 306 W. Ortega Street, and 326 W. De la Guerra Street. The commercial properties may include 15 W. Mason Street, 29 State Street, 113 Kimberly Avenue, and a commercial building located at the northeast corner of Mason and Kimberly Streets. Table 11, "With-Project Relocations" shows each alternative and its associated relocations.

Table 11. With-Project Relocations

Alternative	Commercial Building	Small Apartment Building	Residential Building	Metal Building
Alternative 1	n/a	n/a	n/a	
Alternative 2	1 whole take	0	1 whole take	0
Alternative 3	1 whole take	0	0	0
Alternative 4	1 whole take	1 (4 units)	6*	1
Alternative 5	4 whole takes	1 (4 units)	9*	1
Alternative 6	1 whole take	1 (4 units)	9*	1
Alternative 7	1 whole take	1 (4 units)	9*	0
Alternative 8	1 whole take	1 (4 units)	6*	0
Alternative 9	4 whole takes	1 (4 units)	9*	0
Alternative 10	1 whole take	1 (4 units)	9*	0
Alternative 11	1 whole take	1 (4 units)	9*	0
Alternative 12	2 whole takes	1 (4 units)	4 whole takes	0

* Two of the residences may be relocated on their lots instead of being destroyed

Other Improvements (No Relocation)

In addition to the taking of entire buildings which would necessitate the relocation of businesses or inhabitants, the required takes would also involve partial area of buildings, or whole structures which are not used to provide a residence or house a business, e.g. garages, sheds, decks. Table 12, "Other Improvements To Be Taken" describes those required takes.

Table 12. Other Improvements To Be Taken

Alternative	Commercial Building	Railroad Station Platform/Track	Patio Deck	Metal Structure	Garage
Alternative 1	n/a	n/a	n/a	n/a	n/a
Alternative 2	1 partial take	0	1	0	1
Alternative 3	1 partial take	0	1	0	1
Alternative 4	1 partial take	1 partial take	1	1 partial take	3
Alternative 5	1 partial take	1 partial take	1	1 partial take	3
Alternative 6	1 partial take	1 partial take	1	1 partial take	3
Alternative 7	1 partial take	1 partial take	1	1 partial take	3
Alternative 8	1 partial take	2 partial takes	1	0	3
Alternative 9	1 partial take	2 partial takes	1	0	3
Alternative 10	1 partial take	2 partial takes	1	0	3
Alternative 11	1 partial take	2 partial takes	1	0	3
Alternative 12	1 partial take	2 partial takes	1	0	3

Relocation of Bridges

As previously discussed, several bridges must be replaced for any of the alternatives. Table 13, "Bridge Relocation" shows which bridges are proposed to be replaced.

Table 13. Bridge Relocation

Alternative	De la Guerra	Ortega Street	Cota Street	De la Vina Street	Gutierrez Street	Montecito Street	Union Pacific Railroad	Chapala Street	Mason Street	Total
1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	0
2		X	X			X	X	X	X	6
3		X	X			X	X	X	X	6
4		X	X	X		X	X	X	X	7
5		X	X	X		X	X	X	X	7
6		X	X	X		X	X	X	X	7
7		X	X	X		X	X	X	X	7
8		X	X	X					X	4
9		X	X	X					X	4
10		X	X	X					X	4
11		X	X	X					X	4
12		X	X	X					X	4

Utilities

Any utilities crossing the creek under any of the bridges to be replaced would be affected in the with-project condition. Currently, both water and sewer cross under bridges in the project area. The costs associated with utility relocation have been included as part of the bridge replacement and relocation costs.

Acquisition Costs

Acquisition costs associated with the relocations, structures takes, land takes with easements, land takes without easements, and construction and OMRR&R lands are detailed in the table below. These numbers were used in the development of the NED analysis in the *Plan Selection Section*. The lands and structures costs have been updated based on the most current gross appraisal dated February 2000.

Table 14. Total Real Estate Costs

Alternative	Lands and Structures Costs	Relocation Costs	Total Admin Cost	Contingency (15%)	Total Acquisition Cost
1	n/a	n/a	n/a	n/a	0
2	$3,484,000	$45,000	$185,000	$557,000	$4,271,000
3	$3,202,000	$22,500	$175,000	$510,000	$3,910,000
4	$4,647,000	$315,000	$340,000	$795,000	$6,097,000
5	$5,880,000	$405,000	$335,000	$993,000	$7,613,000
6	$5,062,000	$315,000	$350,000	$873,000	$6,569,000
7	$5,152,000	$315,000	$350,000	$873,000	$6,690,000
8	$4,030,000	$315,000	$320,000	$700,000	$5,365,000
9	$5,533,000	$383,000	$335,000	$938,000	$7,189,000
10	$4,812,000	$270,000	$330,000	$812,000	$6,224,000
11	$4,805,000	$315,000	$330,000	$818,000	$6,268,000
12	$4,567,000	$169,000	$513,000	$787,000	$6,036,000

Environmental

With-Project environmental impacts are a major concern of local residents. This section summarizes the findings of the Environmental Impact Statement/Environmental Impact Report, which can be found following the Main Report Exhibit Section. After the Alternatives Formulation Briefing, based on environmental benefits and the cost benefit ratio, a decision was made that Alternative 12 provides the most incidental environmental benefits and meets the required cost benefit ratio. Twelve alternatives were developed during the feasibility study. However, these alternatives were similar in nature; therefore, based on criteria, similarities and differences in the basic design features, the decision was made to evaluate four Alternatives for detailed environmental analysis in the EIS/EIR. They are Alternatives 1, 6, 8, and 12.

The remaining eight Alternatives were not evaluated further for environmental impacts. Four of them, Alternatives 2, 3, 5, and 9, were not analyzed because they do not achieve a benefit to costs ratio greater than 1. The various design features of Alternatives 4, 6, and 7 have corresponding equivalents in Alternatives 8, 10, and 11, while Alternative 12 corresponds to design features of Alternatives 10 and 11. Based on those equivalencies, further environmental evaluation has not been performed for Alternatives 4, 7, 10, and 11.

During subsequent formulation wherein additional mitigation requirements and the related construction costs were included, including the updated right-of-way costs, it was revealed that only alternatives 4, 8, and 12 would be economically viable.

Water Resources

Impacts to water resources under the with-project condition would be considered significant if any of the following conditions existed:

- if the project would consistently discharge pollutants into the creek during debris removal operations,
- if turbidity levels during excavation, construction, and periodic debris removal are significantly greater than levels encountered during floods on the creek and under anticipated future without-project conditions,
- if the project would have significant adverse impact on groundwater recharge,
- if the penetration rate of water is significantly reduced due to impervious cover of the creek bottom,
- if discretionary development inconsistent with the goals and policies of the City of Santa Barbara and Santa Barbara County's Water Quality Management Plans takes place, and
- if the proposed project is not in compliance with Federal, State, and local water quality regulations.

Alternative 1 - Under the No Action Alternative there would be no project related change in the baseline conditions. To the degree that the City and County of Santa Barbara are successful in developing and implementing BMPs (Best Management Practices) for reduction of stormwater related pollution of Lower Mission Creek, concentrations of contaminants could be expected to decrease over time.

Alternatives 6, 8 and 12 - Impacts to water resources are similar under each of the alternatives. Turbidity levels would increase due to excavation of the creekbed. The construction activity would only occur during non-flood season; therefore, impacts would be short-term and localized. Turbidity levels would also increase during future debris removal. This impact would be short term and localized and would not exceed turbidity levels under the future without project conditions. With utilization of appropriate construction methods and adherence to debris removal permit requirements, with-project conditions would not have a significant impact on water resources.

Compliance with Environmental Laws and Permit Requirements - Project impacts on water quality due to both construction and future sediment removal are anticipated to be adverse but short term and localized. With utilization of measures to reduce turbidity and avoid spills, impacts are not anticipated to be significant. The proposed project would be consistent with the City of Santa Barbara General Plan and Policy guidelines for water quality. A 404(b)(1) water quality evaluation has been included in the EIS/EIR. The permit for future maintenance is currently being coordinated with the Corps Regulatory Branch. A waiver has been obtained from the State for the State Section 401 Water Quality Certification for the project construction and future maintenance of the project.

A Pollution Prevention Plan will be prepared to meet Section 402 of the Clean Water Action and National Pollutant Discharge Elimination System (NPDES) Storm Water Program requirements prior to project construction. The construction contractor will prepare a Storm Water Pollution Prevention Plan (SWPPP) to reduce erosion and degradation to the waters of the United States. A 1603 Streambed Alternation permit would be required prior to construction from the California Department of Fish and Game. If all of these requirements are met, the project will be in compliance with Federal and State water quality regulations.

Ground Water Recharge Impacts - Although creek banks would be stabilized using concrete walls, there would be no measurable decrease in water percolation through the sideslopes because the existing sideslopes consist of various impermeable surfaces. In addition, most of the percolation would continue through the natural creek bed. Construction and maintenance are not anticipated to have an appreciable effect on the amount of groundwater recharge.

Mitigation Measures - The mitigation measures to be used to mitigate increased turbidity during construction require that a diversion pipe or pipes be installed to convey flow across the section that is currently under construction for areas above HWY 101. Diversion structures that divide the creek and allow dewatering of the construction side would be used below HWY 101. The mitigation measures to be used to mitigate short term impacts to surface water quality from fuels, solvents, and lubricants associated with construction equipment include the following:

Equipment shall be in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work.
Corps shall develop and implement a spill prevention and remediation plan and workers will be instructed as to its requirements.
Construction supervisors and workers shall be instructed to be alert for indications of equipment related contamination such as stains and odors.
Construction supervisors and workers shall be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan, if indications of equipment related contamination are noted.
Construction equipment shall only be operated within dewatered areas of the creek.
Construction equipment shall not be repaired within the creek.

Biological Resources

The following is a list of biological resources goals and policies set forth by the City of Santa Barbara's General Plan Conservation Element:

Goal - Enhance and preserve the City's critical ecological resources in order to provide a high quality environment necessary to sustain the City's ecosystem.
Policy 4.0 - The habitat of rare and endangered species shall be preserved.
Policy 6.0 - Intertidal and marine resources shall be maintained or enhanced.
Policy 10.0 - Programs shall be developed to maintain a productive urban biotic community.

In addition, the City of Santa Barbara's Local Coastal Plan includes the following policies:

- 6.1 - The City . . . shall protect, preserve and where feasible restore the biotic communities designated in the City's Conservation Element . . .

- 6.8 - The riparian resources, biological productivity, and water quality of the City's coastal creeks shall be maintained, preserved, enhanced, and where feasible, restored.

These goals and policies will be used as the evaluation criteria for the assessment of with-project biological impacts and mitigation.

Impacts to Biological Resources - All alternatives, including the No Action Alternative under the with-project condition have adverse effects on bank vegetation including some large trees, initially the bottom of the channel itself, and temporal impacts due to future maintenance. Construction of a flood control channel would have a direct and beneficial effect on the bottom of the channel by removing existing concrete, building fish related mitigation measures, and creating turbulent conditions that would facilitate both ascent and descent of the creek by steelhead. Construction of stepped walls (Alternatives 2, 5-7 and 9-11) would allow planting of shrubby native species that would grow to the status of an understory plant community. Real estate properties consumed by construction of a channel to convey 3400 cfs would allow planting as many as six parcels with native trees. Maturation of trees in these "habitat expansion zones" would restore important islands of riparian canopy at irregular intervals along the creek's banks. Finally, the combined use of a single lower wall along the channel bottom and riprap bank stabilization above the wall (Alternative 12) would facilitate restoration of bona fide riparian habitat along portions of Mission Creek. Table 15 presents a qualitative summary of anticipated environmental impacts and the proposed mitigation measures. Complete discussion on biological resources can be found in Chapter 10 of the EIS/EIR following the Main Report.

Table 15. Summary of Anticipated Environmental Impacts

Alternative	Net Adverse Impacts	Neutral Effects	Mitigation Measures and Beneficial Project Design Features
No Action	bank vegetation stream channel	steelhead & tidewater gobies water temperature estuarine habitat	
Vertical Walls, 2500 cfs	bank vegetation* isolated native trees stream channel steelhead & tidewater gobies	water temperature	restoration of natural bottom turbulent, heterogeneous currents and riffles, expand estuarine habitat
Stepped Walls. 2500 cfs	bank vegetation* isolated native trees stream channel steelhead & tidewater gobies	water temperature	restoration of natural bottom turbulent, heterogeneous currents and riffles, slight expansion of estuarine habitat native riparian understory species
Vertical Walls, 3400 cfs	bank vegetation isolated native trees stream channel steelhead & tidewater gobies	water temperature	restoration of natural bottom turbulent, heterogeneous currents and riffles, twice the estuarine forging habitat for tidewater gobies bank top coppices of native trees
Stepped Walls, 3400 cfs	bank vegetation isolated native trees stream channel steelhead & tidewater gobies	water temperature	restoration of natural bottom turbulent, heterogeneous currents and riffles, expand estuarine habitat twice the estuarine forging habitat for tidewater gobies native riparian understory species bank top coppices of native trees
Low wall with riprap sideslopes 3400 cfs	bank vegetation isolated native trees stream channel	steelhead water temperature	restoration of natural bottom, turbulent, heterogeneous currents and riffles, fish ledges, boulder clusters, fish baffles, hideouts for tidewater gobies, expand estuarine habitat twice the estuarine forging habitat for tidewater gobies, establishment of an integrated riparian corridor having both native canopy and understory species

* Impacts do not lend themselves to full mitigation within project area, therefore, abatement of giant reed stands outside the project's boundaries is suggested.

The following table shows a quantitative summary comparison of the future without project (Alternative 1) and Alternatives 6, 8, and 12. The analysis is detailed in the EIS/EIR. Effects are expressed in habitat units and are based on calculations provided in Appendix C of the EIS/EIR.

Table 16. Quantitative Biological Summary

Habitat Type	No Action Alternative (future without project)	Alternative 6	Alternative 8	Alternative 12
Aquatic	0.66	0.91	0.91	1.08
Stream Bank	0.47	0.40	0.14	0.81
Total	**1.13**	**1.31**	**1.05**	**1.89**

Alternative 12 includes beneficial provisions that are not included in the other 10 structural alternatives. This structural alternative differs from all the other alternatives because it involves construction of a toe wall at the edge of the channel bottom and a slope stabilized by a subsurface layer of riprap leading from the toe wall to the top of the bank. By combining a slope on which native plants could be placed with the conveyance capacity afforded by low vertical walls at the foot of the banks, Alternative 12 would provide the desired flood protection as well as promote the restoration of riparian habitat along Lower Mission Creek. Figure 1. "Toe wall and Riprap Bank Protection " shown on the following page depicts the proposed channel cross section.

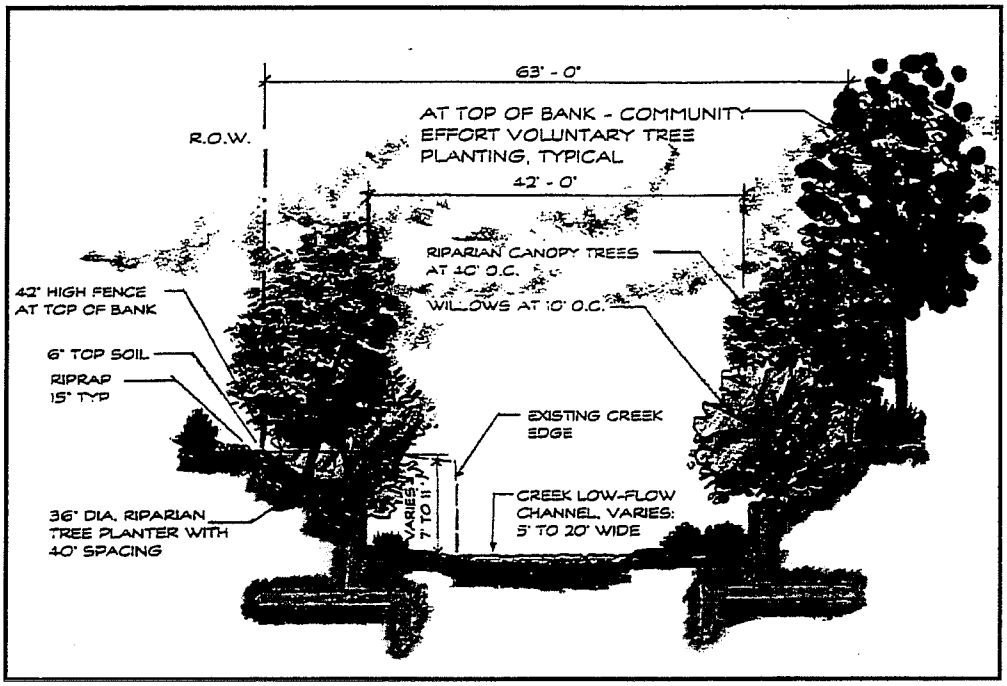


Figure 1. Toe wall and Riprap Bank Protection

Mitigation Measures - Mitigation for with-project impacts would be significant for alternatives 2-11 even with the implementation of mitigation, Alternatives 6 and 8 would result in significant and unavoidable impacts due to the reduction in habitat units as outlined in Table 16. The proposed mitigation measures identified include avoidance of impacts to steelhead, environmental construction commitments to minimize short-term impacts to tidewater gobies, restoration of natural creek bottom, creation of turbulent, heterogeneous currents and riffles, fish ledges, boulder clusters, fish baffles, hideouts for tidewater gobies, expansion of estuarine habitat twice the estuarine forging area for tidewater gobies, establishment of an integrated riparian corridor having both native canopy and understory species, and avoidance of impacts to the Moreton Bay Fig. A detailed description of each of the proposed mitigation measures can be found in Chapter 10 of the EIS/EIR following the Main Report.

Cultural Resources

The City of Santa Barbara's General Plan and Policies has the following restrictions applicable to cultural resources: (1) Sites of significant archaeological, historic, or architectural resources will be preserved and protected wherever feasible and (2) activities and development which could damage or destroy archaeological, historic, or architectural resources are to be avoided. The following paragraphs discuss the impacts associated with each of the alternatives.

Alternative 1 - This alternative would not involve any structural modifications and therefore, will have no adverse impacts to the cultural resources.

Impacts on National Register Listed or Eligible Properties Alt. 6, 8, & 12 – Based on the current design, Alternative 8 and 12 would have no adverse impacts to structures that may be eligible for listing in the National Register of Historic Places. However , Alternative 6 has the potential to require removal of a number of eligible structures. Details on the removal of the structures are listed below:

Alternatives 6:

- Chapala Street Pony Truss Bridge - 1920. National Register eligible. Potential for complete removal.
- Mission Creek Diversion between Chapala Street Pony Truss and Montecito Street Bridges - probably built in 1905. Contributing element to the Railroad Depot National Register listed property. Proposed for complete removal. Sandstone blocks would be reused if possible and/or appropriate.

The following structures are not scheduled to be directly impacted but may suffer some degree of impact, depending on final design:

- 20 W. Mason Street - 1908. Multiple dwelling. National Register eligible.
- 118 Chapala Street - 1911. Triplex, multiple uses. National Register eligible.
- 120 Chapala Street - circa 1913-1914. House. National Register eligible.
- 311/313 West Ortega Street - circa 1907. Duplex. National Register eligible.
- 309 West Ortega Street – circa 1890-1900. House. National Register Eligible.

Impacts on Properties Eligible for or Listed on the California Register or Eligible for or Designated as City Structures of Merit or Landmarks Alt. 6, 8, &12 - All of the properties listed above are also eligible for inclusion on the California Register and for designation as a City Landmark or Structure of Merit. In addition to those properties, the three construction alternatives would have impacts on the following structures.

Alternative 6:

- 15 West Mason Street - 1925. Designated City Structure of Merit. California Register eligible. Potential for complete removal.
- 116 Chapala Street - 1921. Originally a carriage house. National Register eligible. Potential for complete removal.
- 134 Chapala Street - 1960. City Structure of Merit eligible. Potential for complete removal.
- Potter Hotel Footbridge - circa 1905. City Structure of Merit eligible. Potential for complete removal.
- 536 Bath St. - 1910. House. National Register eligible. Potential for complete removal.
- 306 West Ortega Street - 1928. California Register and City Structure of Merit eligible. Potential for complete removal.

Alternative 8:

- Alternative 8 has the same impacts as alternative 6 except for the Potter Street Bridge and that the property at 134 Chapala Street has potential for partial removal rather than complete removal.

Alternative 12:

- 15 West Mason Street - 1925. Designated City Structure of Merit. California Register eligible. Potential for complete removal.

NEPA Mitigation -

Under NEPA, mitigation of cultural resources is confined to those properties that have been evaluated for their eligibility for inclusion in the National Register of Historic Places (NRHP). At that time they become known as "historic properties". Following determinations of eligibility, historic properties are assessed for the criteria of effect and adverse effect. If the

project will adversely affect a historic property, mitigation measures will be required to reduce the impacts to a level of no adverse effect.

A possibility exists that ground disturbing activities, especially near archaeological sites CA-SBA-27 and SBA-28, may uncover subsurface deposits. A qualified archaeological monitor will be in place during all ground disturbing activities and he/she will be empowered to halt construction until the situation is resolved. Local ordinances require the presence of a Native American monitor that has traceable hereditary roots to the Barbareño Chumash. The National Historic Preservation Act has no such requirements for Native American monitoring.

Compliance with Section 106 – Alternative 12 as designed is in compliance with Section 106 of the National Historic Preservation Act. The State Historic Preservation Officer (SHPO) transmitted a letter dated August 3, 2000 that agrees with the Corps' determinations of eligibility, non-eligibility and no adverse effect. The following buildings and structures are eligible for inclusion in the NRHP Places under Criterion C : 118 Chapala Street, 120 Chapala Street, 20 W Mason Street, 309 W Ortega Street, 311/313 W Ortega Street, Chapala Street Pony Truss Bridge, and the Mission Creek Diversion.

SHPO concurred with our determination that the project as planned will have no adverse effects on properties that are eligible for, or included in the NRHP. No further work towards Section 106 compliance is required.

CEQA Mitigation - CEQA requires the development of specific mitigation measures as part of the EIS/EIR. The specific mitigation measures for each of the potentially affected structures can be found in Section 18 of the EIS/EIR.

Residual Impacts – Under CEQA, the project will result in significant and unavoidable cultural resources impacts due to the complete removal of 15 West Mason Street.

Hazardous, Toxic and Radioactive Waste

The City of Santa Barbara General Plan and Policies applicable to HTRW state, Athe City shall support the programs of all governing agencies, including those of the Regional Water Quality Control Board which respect to best management practices for Santa Barbara's watersheds and urban areas. The County and City of Santa Barbara is planning to submit a joint Stormwater Pollution Prevention Plan (SWPPP) to the Central Coast Regional Water Quality Control Board (CCRWQCB) to satisfy requirements of the National Pollution Discharge Elimination System (NPDES).

Alternative 1 - Under the No Action Alternative there would be no project related change in the baseline conditions found in the without-project condition.

Alternatives 6, 8 and 12 - Under project construction Alternatives 6, 8 and 12, foreseeable potential impacts would be related to construction activities. These would include:

- Possible need to dispose of contaminated soils encountered during excavation activities;
- Possible water contamination by excavation of streets and buildings where existing soil contamination is unidentified;
- Possible release of hydrocarbon contaminated groundwater encountered in excavation activities downgradient of Haley Street;
- Possible water contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants;
- Sediment contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants;
- Possibility of encountering PCE contaminated soil and/or shallow groundwater in the vicinity of the West Gutierrez Street Bridge. This event could potentially cause releases of this substance to the environment; and,
- Possibility of encountering deep sediment contaminated by HTRW. Although analysis of shallow sediments did not identify concentrations of target analyses above regulatory action thresholds, there is an unknown degree of probability that excavation activities could encounter previously undetected contamination at deeper levels.

Future Maintenance - During future sediment removal/maintenance all the environmental commitments identified in the mitigation section would be followed to avoid contamination within the project area.

Mitigation Measures - The mitigation measures to be used to mitigate potential HTRW impacts from fuels, solvents, and lubricants associated with construction equipment include the following:

Equipment will be in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work.
Corps will develop and implement a spill prevention and remediation plan and workers will be instructed as to its requirements.
Construction supervisors and workers will be instructed to be alert for indications of equipment related contamination such as stains and odors.
Construction supervisors and workers will be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan, if indications of equipment related contamination are noted.
Construction equipment will only be operated within dewatered areas of the creek.

The mitigation measures to be used to mitigate potential HTRW impacts from the possibility of PCE contaminated soil and/or shallow groundwater in the vicinity of West Gutierrez Street Bridge include the following:

Prior to commencement of excavation activities on the downstream side of the West Gutierrez Street Bridge, a shallow groundwater, water and soil sampling plan will be developed to detect the presence of PCE and/or toxic byproducts of PCE degradation.
The recommended sampling plan will be implemented prior to commencement of excavation activities.

If PCE or hazardous or toxic byproducts of PCE degradation are detected, the CCRWQCB and County Department of Health and Human Services will be consulted to help assess the situation and an appropriate regulatory response will be developed to remediate the contamination.

The mitigation measures to be used to mitigate potential HTRW impacts from the possibility of encountering deep contaminated sediment includes the following:

When the Corps is prepared to commence excavation activities, samples of creek sediments will be taken to the depth of planned excavation and the same suite of analyses used to characterize the shallow sediments will be used to analyze the deep sediments.
In the event regulatory actionable concentrations of contaminants are detected by the analyses, the Corps will develop a plan to characterize the extent of contamination.
A plan will then be developed to comply with applicable laws and regulations related to the identified contamination so that excavation activities do not result in releases of HTRW into the environment.

Noise

The Noise Element of City of Santa Barbara General Plan points out problem areas and sets goals for maintaining and enhancing good noise conditions and improving areas with noise problems. Policy 6.0 of the Noise Element states that, "noise control activities should be coordinated with those agencies of other local jurisdictions". Noise related impacts would be considered significant if noise level is excessive and results in abusive sound.

Alternative 1 - The past routine maintenance performed in the creek temporarily raised noise levels due to construction equipment and truck transportation. The No Action Alternative will continue routine maintenance.

Alternatives 6, 8 and 12 - Construction equipment would elevate the noise levels within the project area. In commercial areas, noise levels tend to be higher than in residential areas. Therefore, in commercial areas noise impacts would be less compared to the residential area. The residential area would experience elevated noise levels during construction and future maintenance. Increase in noise levels compared to existing noise level is about 10 to 15 dBA. Noise increases would be localized; impacts would be short term.

Mitigation Measures - The following mitigation measures are proposed for noise impacts:

Operation of heavy equipment would be limited to the hours between 8 am and 5 pm. Truck transportation would be permitted between 7 am and 7 pm Monday through Saturday.
No operation or transportation would occur on Sundays and holidays.

Truck traffic would be limited to the designated truck routes.
The construction contractor would follow noise ordinance requirements established by the City.

Air Quality

Air quality impacts would be significant if emissions generated by project construction permanently exceeded the thresholds set by the Federal Government (Environmental Protection Agency) and the Santa Barbara County Air Pollution Control District.

Alternative 1 - Under the No Action Alternative, fugitive dust would increase during periods of debris removal. The impacts would be temporary and short term and conditions would be stabilized after completion of the maintenance.

Alternative 6, 8 and 12 - With-project related activities that contribute to emissions include: removal of existing banks; channel excavation; transporting material from creek bed to stockpile area; processing material on site; and disposal of stockpiled material. A haul route would be developed to transport the material to the staging area. It is assumed that project construction would result in significant amounts of particulate mater and about 90% of this fugitive dust would be created by trucks traveling on unpaved surfaces. Future maintenance activities would increase fugitive dust but would stabilize soon after the maintenance activities.

Mitigation Measures - The following mitigation measures are suggested to mitigate for impacts to air quality:

The contractor will water the excavation site, storage piles and unpaved roads twice each day of construction; once in the morning and at the end of the construction day. This mitigation is applicable for both construction and future maintenance.
Transported material shall be covered to reduce fugitive dust.
Vehicle speed limits will be 15 mph maximum within the construction site and maintenance areas (construction and future maintenance), and cease grading and earth movement when wind speeds exceed 20 mph, or as confirmed by Santa Barbara County Air Pollution Control District during construction and future maintenance activities.

Recreation

Recreation along Lower Mission Creek is an important resource to the residents of Santa Barbara. The creek is used for hiking and bird watching. Also, the Moreton Bay Fig Tree, a prominent City of Santa Barbara landmark, is located adjacent to the creek. For the purposes of the with-project evaluation, impacts are considered significant if project implementation would result in the loss of existing recreational areas or pursuits and loss of access to recreational areas. Only a small amount of park area is available to the residents in the Lower Mission Creek area; therefore, elimination of this resource is considered an adverse impact.

Alternative 1

The No Action alternative would not have any impacts on the existing recreational activities in the Lower Mission Creek area.

Alternative 6

These alternatives consist of the removal of various types of existing banks and development of a natural creek bottom, which would improve the aesthetic and visual quality of the creek. The proposed step walls would be vegetated to simulate a natural creek appearance. Habitat expansion zones would be created along the creek banks where real estate is available. The habitat expansion zone development is part of the biological mitigation as discussed above. The habitat expansion zones should attract birds and people who enjoy bird watching. Compared to the existing conditions, the project would result in long term beneficial impacts.

Also, recreational use of the creek will be restricted during construction. Because construction of the creek will be staged, this impact is considered temporary and not significant.

Alternative 8 (Vertical Walls)

The extensive use of vertical walls in alternative 8 would alter the visual quality of the creek, which is directly related to the recreational activities of walking, hiking, and enjoying the natural environment. Although the creek bottom would be natural, the construction of vertical walls will have adverse impacts on recreational activities such as walking and bird watching.

Also, recreational use of the creek will be restricted during construction. Because construction of the creek will be staged, this impact is considered temporary and not significant.

Alternative 12

This alternative involves construction of a natural bottom channel, stabilizing the creek banks with a combination of vertical walls and vegetated riprap slopes. Compared to any other alternatives, this alternative will provide maximum coverage of natural vegetation within the project area. Native and riparian type of vegetation may increase the bird population. Recreational activities such as bird watching, walking along the creek, viewing of revegetated riparian habitat will be provided by construction of this alternative.

Future Maintenance

All alternatives would require some annual maintenance to maintain the design capacity of the channel. Weed and vegetation growth in the channel bottom would at a minimum require partial removal annually (using a mosaic pattern) to maintain the design capacity. In addition, any areas where sediment deposition occurs would require removal if more than fifteen percent of the channel capacity is plugged. It is estimated that the average frequency of this removal of plugs is a minimum of every three years. It is important to note that the channel may require maintenance more frequently than the minimum stated above.

Mitigation Measures

Mitigation measures included in the alternatives are (1) planting of natural riparian vegetation, (2) creation of small habitat expansion zones, (3) creation of fish related mitigation features, (4) mosaic pattern of vegetation clearing, (5) establishment of a low flow channel, and (6) timing of maintenance activities. These mitigation measures would provide increased opportunity for bird watching and provide maximum access to the residents for recreational use.

H. NED Plan Selection

This Feasibility Study investigates the alternatives for flood control along Lower Mission Creek, and whether a National Economic Development (NED) plan exists for implementation in accordance with Federal water resources planning principles, guidelines, procedures and policies. This section considers the various benefit and cost accounts that would be affected by each alternative, and whether an economically optimal flood control alternative exists.

Benefits

Benefits from the proposed alternatives include reduction of damages to structures and contents, automobile transportation delay, emergency repair and clean-up costs, and FEMA overhead costs. Also, the extended life that is added to bridges in the floodplain is included as a benefit. Annual with-project damages were estimated and subtracted from without-project damages to arrive at damages prevented for each alternative's benefits.

With-Project Damage Reduction for Structures and Contents

The with-project damages for structure and contents were estimated using the HEC-FDA model. Evaluation of damages for the alternatives was based on the configuration of each alternative. Table 17 shows the benefits for structures and contents for both the Lower Mission Creek drainage area and the Laguna Channel drainage area.

Table 17. Reduction in Structural and Content Damages

Alternative	Benefits (Reduction in Structural and Content Damages)
Alternative 2	1,404,000
Alternative 3	1,277,000
Alternative 4	1,617,000
Alternative 5	1,859,000
Alternative 6	1,779,000
Alternative 7	1,757,000
Alternative 8	1,403,000
Alternative 9	1,675,000
Alternative 10	1,582,000
Alternative 11	1,571,000
Alternative 12	1,367,000

Reduction of Bank Stabilization Costs

Since all the proposed alternatives are expected to have a channel that is stabilized by concrete or riprap, each alternative is expected to have zero cost for bank stabilization. The annual benefit from the reduction in bank stabilization is $37,500.

Automobile Transportation Delay

The with-project evaluation of transportation losses is similar to those for the without-project condition. Therefore, there is not a significant benefit associated with reduction in transportation delay. Table 18 shows the benefits associated with reduction in transportation delay.

Table 18. Reduction in Transportation Damages

Design Capacity	Without-Project Damages	With-Project Damages	Reduction in Damages
2500 cfs	$19,200	$17,200	$2,000
3400 cfs	$19,200	$15,200	$4,000

Emergency Repair and Clean-up Costs

The costs relating to evacuation, disaster relief and the clean-up of sediment will be reduced due to the reduction of flooding frequency. Table 19 shows the benefits associated with emergency repair and clean-up costs due to a reduction in flooding frequency.

Table 19. Reduction in Emergency Repair and Clean-up Damages

Design Capacity	Without-Project Damages	With-Project Damages	Benefit (Reduction in Damages)
2500 cfs	$118,400	$68,700	$49,700
3400 cfs	$118,400	$43,600	$74,800

FEMA Overhead Costs

There are certain flood insurance costs that can be saved by reducing the flood threat in the Lower Mission Creek area. The flood insurance costs, which can be reduced, include the overhead and administrative cost of processing applications and operation of the National Flood Insurance Program. The current overhead cost per policy is $138. Annual benefits for the 2500 cfs and the 3400 cfs alternative are equal to $4,000 and $8,700, respectively. The following table details the savings in flood insurance overhead.

Table 20. Savings in Flood Insurance Overhead

Design Capacity	Number of Policies Without Project	Number of Policies With Project	Net Reduction	Overhead Costs per Policy	Savings
2500 cfs	237	208	29	$138	$4,000
3400 cfs	237	174	63	$138	$8,700

Advanced Bridge Replacement

The proposed alternatives include the construction of several new bridges. The expected life of the replacement bridges is expected to be greater than that of the existing structures, thereby extending the service life of the bridges. Since the total cost of the new bridge is included in the first cost of the project (see the following section), a credit for the life extension is calculated as a benefit. A credit is also considered for the reduction in operation and maintenance costs. Table 21 displays the annual benefits associated with each alternative.

Table 21. Annual Benefits for Advanced Bridge Replacement

Bridge	Advance Bridge Replacement	Reduction in Annual Maintenance
Alternative 2	$173,000	$20,000
Alternative 3	$173,000	$20,000
Alternative 4	$189,000	$20,000
Alternative 5	$189,000	$20,000
Alternative 6	$189,000	$20,000
Alternative 7	$189,000	$20,000
Alternative 8	$88,000	$13,000
Alternative 9	$88,000	$13,000
Alternative 10	$88,000	$13,000
Alternative 11	$88,000	$13,000
Alternative 12	$88,000	$13,000

Costs

The construction cost for each of the twelve alternatives will be amortized over the 50 year project life. Project costs include Interest During Construction (IDC) and operation and maintenance costs. Table 22 shows the costs associated with each alternative.

Table 22. With-Project Costs

Description	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 9	Alt 10	Alt 11	Alt 12
Construction First Costs											
Real Estate	$4,272,000	$3,910,000	$6,097,000	$7,613,000	$6,568,000	$6,690,000	$5,365,000	$7,188,000	$6,224,000	$6,268,000	$6,036,000
Channel Construction	$7,282,000	$6,224,000	$7,411,000	$8,903,000	$8,625,000	$8,468,000	$7,536,000	$9,049,000	$8,769,000	$8,612,000	$6,454,000
Bridge Construction	$3,730,000	$3,733,000	$4,084,000	$4,084,000	$4,084,000	$4,084,000	$2,225,000	$2,225,000	$2,225,000	$2,225,000	$2,287,000
Environmental Mitigation	$531,000	$522,000	$987,000	$889,000	$1,149,000	$995,000	$928,000	$890,000	$937,000	$937,000	$801,000
Aesthetic Treatment Mitigation	$334,000	$295,000	$294,000	$349,000	$339,000	$294,000	$290,000	$346,000	$335,000	$329,000	$183,000
Planting and Maintenance	$16,000	$0	$0	$22,000	$18,000	$16,000	$0	$21,000	$18,000	$15,000	$302,000
Subtotal Construction Costs	$16,165,000	$14,684,000	$18,873,000	$21,860,000	$20,783,000	$20,547,000	$16,344,000	$19,719,000	$18,508,000	$18,386,000	$16,063,000
Planning, Engineering And Design	$1,784,000	$1,616,000	$1,916,000	$2,137,000	$2,132,000	$2,079,000	$1,647,000	$1,880,000	$1,843,000	$1,818,000	$1,504,000
Construction Management	$750,000	$679,000	$805,000	$898,000	$896,000	$873,000	$692,000	$789,000	$774,000	$763,000	$632,000
Subtotal Project Cost	$18,699,000	$16,979,000	$21,594,000	$24,895,000	$23,811,000	$23,499,000	$18,683,000	$22,388,000	$21,124,000	$20,967,000	$18,199,000
Total IDC [1]	$1,199,000	$1,089,000	$1,385,000	$1,597,000	$1,527,000	$1,507,000	$1,198,000	$1,436,000	$1,355,000	$1,345,000	$1,167,000
Total Gross Investment	$19,898,000	$18,068,000	$22,979,000	$26,492,000	$25,338,000	$25,006,000	$19,881,000	$23,824,000	$22,479,000	$22,312,000	$19,200,000
Annual Cost for Project	$1,374,000	$1,247,000	$1,587,000	$1,829,000	$1,749,000	$1,727,000	$1,373,000	$1,645,000	$1,552,000	$1,541,000	$1,337,000
Annual Cost for OMRR&R[2]	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000	$30,000
Total Annual Cost	$1,404,000	$1,277,000	$1,617,000	$1,859,000	$1,779,000	$1,757,000	$1,403,000	$1,675,000	$1,582,000	$1,571,000	$1,367,000

[1]IDC - Interest During Construction

[2]OMRR&R - Operations, Maintenance, Repair , Replacement, and Rehabilitation

Benefit/Cost Analysis

The total annual cost for each alternative is compared to the expected annual benefits to arrive at a benefit-cost ratio. The alternative with the greatest net benefits is considered the NED plan. Table 23, "Benefit-Cost Summary" shows the benefits, costs, net benefits, and benefit-cost ratio for each alternative. The NED Plan for flood control along Lower Mission Creek is Alternative 12 with net benefits of $225,000 and a B/C ratio of 1.16.

Table 23. Benefit-Cost Summary

Category	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6	Alt 7	Alt 8	Alt 9	Alt 10	Alt 11	Alt 12
Total Annual Benefits (x1000)	$0	$995	$995	$1,700	$1,705	$1,700	$1,700	$1,592	$1,597	$1,592	$1,592	$1,592
Total Annual Costs (x1000)	$0	$1,404	$1,277	$1,617	$1,859	$1,779	$1,757	$1,403	$1,675	$1,582	$1,571	$1,367
Net Benefits (x1000)	NA	($409)	($282)	$83	($154)	($79)	($57)	$189	($78)	$10	$21	$225
B/C Ratio	**NA**	**0.7**	**0.8**	**1.0**	**0.9**	**0.9**	**0.9**	**1.1**	**0.9**	**1.0**	**1.0**	**1.2**

System of Accounts

The US Water Resources Council System of Accounts was used as a method of displaying the positive and negative effects of the proposed alternatives. The accounts are categories of long-term environmental, economic, and other social impacts of the alternatives. These are displayed in tables that allow efficient consideration of comparative effects. The Water Resources Council suggests using four accounts to compare proposed water resource development plans. These are the national economic development (NED), environmental quality (EQ), regional development (RD), and other social effects (OSE) accounts.

National Economic Development (NED) Account

This account identifies the economic effects of alternative plans on the nation's economic development. Beneficial effects are increases in the economic value of the national output of goods and services attributable to a plan. For the Lower Mission Creek alternatives under consideration, the increases in NED reflect the results of the benefit/cost analysis. For this project, benefits are derived from the reduction in flood frequency in both the Lower Mission Creek and Laguna Channel flood plains. The benefits are measured by the difference in the cost of damages between the without-project and the with-project condition. Adverse NED effects are the costs of the project, and represent the opportunity cost of investing funds on the project rather than other potential economic development opportunities. Table 24, "System of Accounts - National Economic Development Account" compares the alternative plans under consideration using the NED account. This table indicates that Alternative 12 would have the highest net benefits.

Environmental Quality (EQ) Account

The environmental quality (EQ) account displays the long term effects of alternative plans on significant environmental resources. Significant environmental resources are defined by the Water Resources Council as those components of the ecological, cultural and aesthetic environments, which, if affected by the alternative plans, could have a material bearing on the decision-making process of plan selection. Table 25, "System of Accounts - Environmental Quality Account" compares the effects that the alternative plans would have on environmental quality resources. The impacts, especially significant impacts, would be mitigated according to discussions found in Section IV. G, "Evaluation of Alternative Plans" above, and EIS/EIR.

Regional Economic Development (RED) Account

The regional economic development account is intended to illustrate the effects that the proposed plans would have on regional economic activity, specifically regional income and regional emolument. This account was not considered for this analysis because the local sponsor did not request a regional evaluation. Additionally, RED benefits are not considered in determining Federal interest.

Other Social Effects (OSE) Account

This account typically includes long-term community impacts in the areas of public facilities and services, recreational opportunities, transportation and traffic, and man-made and natural resources. Table 26, "System of Accounts - Other Social Effects Account" compares the effects that the proposed alternatives would have on OSE resources.

Table 24. System of Accounts - National Economic Development Account (1999 Price Levels in thousands)

	Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt.6	Alt. 7	Alt. 8	Alt 9	Alt 10	Alt 11	Alt 12
Reduction in Struct and Content Damages	$0	$709	$709	$1,367	$1,372	$1,367	$1,367	$1,367	$1,372	$1,367	$1,367	$1,367
Advance Bridge Replacement	$0	$173	$173	$189	$189	$189	$189	$88	$88	$88	$88	$88
Reduction in Clean-up/Emergency Costs	$0	$50	$50	$75	$75	$75	$75	$75	$75	$75	$75	$75
Reduction in Transportation Delay	$0	$2	$2	$4	$4	$4	$4	$4	$4	$4	$4	$4
Reduction in Flood Ins. Overhead&Admin	$0	$4	$4	$8	$8	$8	$8	$8	$8	$8	$8	$8
OMRR&R Costs Reduction	$0	$37	$37	$37	$37	$37	$37	$37	$37	$37	$37	$37
Reduction in Bridge Maintenance	$0	$20	$20	$20	$20	$20	$20	$13	$13	$13	$13	$13
Total Annual Benefits	$0	$995	$995	$1,700	$1,705	$1,700	$1,700	$1,592	$1,597	$1,592	$1,592	$1,592
Annual OMRR&R	$0	$30	$30	$30	$30	$30	$20	$30	$30	$30	$30	$30
Total Annual Cost for Project	$0	$1,404	$1,277	$1,617	$1,859	$1,779	$1,757	$1,403	$1,675	$1,582	$1,571	$1,367
Net Benefits	**NA**	**($409)**	**($282)**	**$83**	**($154)**	**($79)**	**($57)**	**$189**	**($78)**	**$10**	**$21**	**$225**
B/C Ratio	**NA**	**0.71**	**0.78**	**1.0**	**0.9**	**0.9**	**0.9**	**1.1**	**0.9**	**1.0**	**1.0**	**1.2**

Notes:

1. New bridge costs (25% contingency) incl. demo and traffic control
2. 20% contingency factor applied to construction costs
3. 15.0% PE&D
4. 6.30% S&A
5. De La Vina Bridge replaced prior to this project, Incremental cost to increase capacity added as NED cost
6. 15% contingency applied to real estate. Real estate costs for Alts 2-11 were adjusted by a magnitude of 2.5 based on gross appraisal results for Alt 12, which was 2.5-3.0 times more than the initial real estate estimates.
7. Annual bridge O&M reduction included as project benefits
8. OMRR&R Costs Reductions is 4-year ave bank stabilization and clean-up costs by County FCD.

Table 25. System of Accounts - Environmental Quality Account

Category	Alt. 1	Alt. 6
I. PHYSICAL ENVIRONMENT		
a. Water Quality	High turbidity during heavy flows	Same as Alt. No. 12
b. Air Quality	No Impacts/ No change to existing conditions	Same as Alt. No. 12
c. Noise Conditions	No Impacts/No change to existing conditions	Same as Alt. No. 12
d. Geology	No Significant Impacts	Same as Alt. No. 12
e. Ground Water Recharge	No change to existing conditions	Same as Alt. No. 12
d. Hazardous, Toxic, and Radioactive Wastes	No Impacts. The two HTRW sites in the project area would continue to be contaminated until such time as clean-up is completed.	Same as Alt. No. 12
II. BIOLOGICAL ENVIRONMENT		
a. Aquatic habitat	Approximately 0.4 habitat units removed by periodic channel maintenance	Net impact to habitat quality equivalent to about 0.5 habitat units in comparison to Alt. 1
b. Isolated Native Trees	No significant impacts	Same as Alt. 12
c. Streambank Vegetation	Projected average environmental quality equivalent to 0.48 habitat units.	Design features yield 0.52 habitat units. Negligible gain in stream bank habitat quality compared to Alternative 1.
d. Endangered Species	No Significant impacts	Same as Alt. No. 12
III. CULTURAL ENVIRONMENT		
a. Cultural Resources	No Impacts	Same as Alt 12, w/o buildings 7-9.
b. Aesthetics	No change to existing conditions	(1) Short-term impact would be same as Alternative 12. (2) Long-term: Compared to existing conditions, the creek course would be wider. More vegetation could be planted on stepped walls. This alternative would have a more pleasing visual appearance compared to existing conditions. Aesthetic treatment would be provided to the vertical walls. Project construction would be performed along oxbow; therefore, meandering course of the creek would be slightly altered. (3) Fencing impacts would be same as alternative No. 12.

Table 26. System of Accounts - Environmental Quality Account

Category	Alt. 8	Alt. 12
I. PHYSICAL ENVIRONMENT		
a. Water Quality	Minor short-term increase in turbidity levels during construction and future maintenance	Minor short-term increase in turbidity levels during construction and future maintenance
b. Air Quality	Same as Alt. No. 12	During construction and future sediment removal, short term increase in fugitive dust; no long term impacts on air quality.
c. Noise Conditions	Same as Alt. No. 12	Short term increase in noise levels due to use of construction equipment and truck traffic. Noise levels will exceed 65 dBA at sensitive receptors. Residents located in the vicinity of the project area will experience increased noise levels during construction as well as during future maintenance.
d. Geology	Same as Alt. No. 12	No Significant long term or short term impacts
e. Ground Water Recharge	Same as Alt. No. 12	In existing condition, hard bottom exists at certain locations within the channel. With the project, the entire project reach would be natural bottom channel, which will result in minor increase in ground water recharge.
d. Hazardous, Toxic, and Radioactive Wastes	Same as Alt. 12	Short-term: During construction, stock piled material, equipment etc. will restrict recreational use of the creek. However, all sections would not be constructed at the same time; therefore, this impact is temporary and not significant. Long-term impacts: This alternative provides maximum recreational opportunity compared to other alternatives. These opportunities includes: bird watching, walking along the creek bank, enjoying natural vegetation planted on upper slope of the creek. However, access to the creek bottom will be restricted and the creek's limited use as a connective corridor may be lost.
II. BIOLOGICAL ENVIRONMENT		
a. Aquatic habitat	Same as Alt. No. 6	Net increase of habitat quality equivalent to about 0.4 habitat units when compared to Alternative 1.
b. Isolated Native Trees	Same as Alt. 12	12 to 15 trees will be removed. Western sycamores at two locations would be among them.
c. Streambank Vegetation	All stream bank vegetation removed without design feature to replace it. Net impact equivalent to 0.48 habitat units.	Projected average environmental quality equivalent to 0.82 habitat units. Stream bank habitat would increase by 0.34 habitat units compared to Alternative 1.
d. Endangered Species	Same as Alt. No. 12	Incidental impact to steelhead and tidewater gobies could occur, but would be of temporary and insignificant level. Environmental commitments and mitigation measures form essential parts of the proposed plan.
III. CULTURAL ENVIRONMENT		
a. Cultural Resources	Same as Alt. 6	No historic structures will be impacted under NEPA: Additional structures impacted under CEQA: 15 W. Mason St, Potter Hotel Footbridge, 134 Chapala St, 434 De la Vina St, E. 306 W. Ortega St, 536 Bath St, 116 Chapala St, West Downtown Neighborhood, Waterfront Neighborhood
b. Aesthetics	(1) Short-term impacts would be same as Alternative No. 12 (2) Long-term: The current creek bank protection consists of various types ranging from vertical walls to gabions, sand bags etc. Compared to the existing banks, conditions would be improved; however, the creek banks would not have a natural look. With vertical walls, the creek aesthetics would be altered like a man made concrete channel. To minimize impacts, aesthetic treatments would be applied to the vertical walls. Project would pass through oxbow; therefore, meandering course of the creek would be slightly altered. (3) Fencing installation impacts would be same as Alternative No. 12.	(1) Short-term: During construction, equipment and stockpile material would degrade aesthetic value of the project area. However, this impact is short term and would not be significant. (2) Long Term: Aesthetics/visuals of the creek banks would be improved with stabilization of banks. Implementation of this alternative will provide maximum aesthetic value. Creek will be more natural looking. Provides maximum vegetation cover. Bottom of the creek can not be seen from top because riprap will be planted with native and riparian vegetation. Aesthetic treatment would be provided to the vertical walls. (3) For safety reasons, some type of fencing shall be installed along the banks. If chain-link type of fencing is used, aesthetic treatment would be needed, including planting of vines to reduce impacts.

Table 27. System of Accounts - Other Social Effects Account

Category	Alt. 1	Alt. 6
a. Public Health and Safety	The City of Santa Barbara would have continuing threat of flooding.	Same as Alt. 12
b. Public Facilities and Services	No Impacts	Same as Alt. 12
c. Recreation and Public Access	No change to existing conditions	Short-term impacts would be same as Alt. No. 12. Long-term Impacts: Partially vegetated walls will provide bird watching and walking type of activities. Like Alt. 12 public would not have access to the creek bottom; therefore, creek's use as a connective corridor may be lost.
d. Traffic/Transportation	No Impacts	Same as Alt. 12
e. Man Made Resources	Within the project reach, no open space or agricultural lands exist in right-of-way, no impacts to existing land use.	(1) Same as Alt. # 12 (2) This alternative would require demolition of about 15 complete and 2 partial structures (includes 1 complete removal of commercial building; 4 single family residential units and 5 multiple family units; 1 patio deck and 3 garages). Two commercial buildings would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing.
d. Natural Resources	No Impacts	No Impacts
Socio-economics	Property located along the creek bank would experience economic damage during each severe flooding season. Some commercial establishments would lose business.	(1) Same as Alt. No. 12. (2) This alternative would require demolition of about 15 complete and 2 partial structures (includes complete removal of 1 commercial building; 4 single family residential units and 5 multiple family units; 1 patio deck and 3 garages). Two commercial buildings would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing.

Table 28. System of Accounts – Other Social Effects

Category	Alt. 8	Alt.12
a. Public Health and Safety	Same as Alt. 12	Short-term Impacts: During construction, truck traffic will increase, potentially causing accidents. Long-term Impacts: After completion of the project, it could be possible that people could enter the creek bed and injured. In addition, people may get into by-pass tunnel and criminals may live and hide in culvert.
b. Public Facilities and Services	Same as Alt. 12	Water, sewer and telephone lines are located within the project reach. Relocation of these utility lines would be required. Residents may experience temporary loss of services for short periods.
c. Recreation and Public Access	Short-term: Same as Alt. 12. Long-term: It would reduce opportunity for bird-watching because this alternative provides less opportunity for vegetation planting. Access to the creek bottom will be restricted and the creek's use as a connective corridor will be lost.	Short-term: During construction, stock piled material, equipment etc. will restrict recreational use of the creek. However, all sections would not be constructed at the same time; therefore, this impact is temporary and not significant. Long-term impacts: This alternative provides maximum recreational opportunity compared to other alternatives. These opportunities includes: bird watching, walking along the creek bank, enjoying natural vegetation planted on upper slope of the creek. However, access to the creek bottom will be restricted and the creek's limited use as a connective corridor may be lost.
d. Traffic/Transportation	Same as Alt. 12	Short-term/Long-term: During project construction and future sediment removal, some residents may not have direct access to their residences. Street closure would be required in some locations. This impact is a short-term, temporary increase in truck traffic along selected haul routes. Particular concerns would arise during the replacement of the De la Vina/ Haley Street bridge, which would impact a major commuter route on Haley Street.
e. Man Made Resources	(1) Same as Alt. No. 12 (2) This alternative would require demolition of about 12 complete and 2 partial structures (includes complete removal of 1 commercial building; 3 single family residential units and 4 multiple family units; 1 patio deck and 1 garage). 1 commercial building would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing. Impacts related to installation of culverts are similar to Alternative 12.	(1) No impacts to agricultural lands, Long-term Permanent Impacts: Buildings or property located within the project right-of-way will be removed or demolished for project construction. Therefore, land use would change from residential to natural creek bed or open space. However, most of the buildings located within the project reach are very old and all property located within the flood plains is subject to severe flood damage during heavy rains or flooding. Land use will change from residential to natural creek bed or open space within the construction right-of-way. (2) This alternative would require demolition of 14 complete and 2 partial structures (includes 1 complete removal of commercial building; 4 single family residential units and 5 multiple family units; 1 patio deck and 1 garage). 1 commercial building would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing. No impact to oxbow area. Culverts would be installed away from the creek. During construction, temporary impacts near fig tree.
d. Natural Resources	During Construction, temporary impacts near the Moreton Bay Fig Tree	During Construction, temporary impacts near the Moreton Bay Fig Tree
e. Socio-economics	(1) Same as Alt. No. 12 (2) (2) This alternative would require demolition of about 12 complete and 2 partial structures (includes complete removal of 1 commercial building; 3 single family residential units and 4 multiple family units; 1 patio deck and 1 garage). 1 commercial building would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing.	(1) Long Term Impacts: Some of the property located along the creek bank would be removed. There would be economic loss to the property owner. However, property located within the flood plain would be protected from flooding hazards in future. Demolition of structures/ buildings: Refer to Land Use Section. Relocation of existing tenants may be difficult due to the cost of housing. (2) Alternative 12 would require removal of 14 full structures and 2 partial. See details on type of the structures in Land Use Section.

Additional Evaluation Criteria

The alternative plans were also evaluated using the four criteria suggested by the US Water Resources Council. These criteria are completeness, effectiveness, efficiency, and acceptability.

Completeness

Completeness is the determination of whether or not the plan includes all elements necessary to achieve the planned outputs. Alternatives 4, 8, 10, 11, and 12 may be considered as satisfying the criterion. These alternatives are considered cost-effective means of increase flood protection along Lower Mission Creek.

Effectiveness

Effectiveness is defined as a measure of the extent to which a plan achieves its objectives. The objectives as stated in Section IV.C are: (1) provide increased flood protection for the residents and businesses of Santa Barbara; (2) restore the major species of native riparian community along the project reach; (3) remove and suppress invasive non-native vegetation and replace with native plants; (4) remove man-made construction material along the creek bottom and restore to natural creek; and (5) enhance the aquatic habitat by changing the streambed characteristics. Alternatives 2 through 12 achieve the objective of increased flood protection, removal of non-native species, removal of man-mad construction material in the creek bottom, and enhancing the aquatic habitat . The only alternatives with opportunities to restore the major species of native riparian community along the creek are Alternatives 2, 5, 6, 7, 9, 10, 11, and 12. These alternatives either use stepped walls or low vertical walls topped with riprap slopes, which lend themselves to additional riparian planting on the banks.

The degrees to which the plans address these objectives differ. Alternatives 2 and 3 provide a 15-year level of protection, while alternative 4 through 12 provide a 20-year level of protection. Alternative 12 provides the most opportunity for habitat restoration due to the use of plantable riprap, creation of habitat expansion zones, and creation mitigation features to enhance fish habitat and steelhead migration.

Efficiency

Efficiency is the cost effectiveness of the plan in providing the planned outputs. The most efficient plan has the highest B/C ratio. The NED Plan (Alternative 12) produces the greatest B/C ratio and therefore, the most efficient plan. Alternative 8 is the second most efficient alternative. The B/C ratios for the for all alternatives are shown in Table 23, "Benefit/Cost Summary."

Acceptability

Acceptability is defined as acceptance of the plan by the local sponsor and the concerned public. The local sponsor has indicated support for and prefers Alternative 12 for implementation.

V. DESCRIPTION OF THE SELECTED PLAN

This chapter presents the National Economic Development (NED) and presents the rational for plan selection.

A. *Selected Plan (Recommended Plan)*

The Selected Plan is Alternative 12, which is also the NED Plan. The Non-Federal Sponsor, the SBCFC &WCD supports and prefers the Selected Plan.

This alternative would provide an approximately 20-year level of flood protection. The average annual benefits associated with the NED amount to $1,592,000 equivalent to an annual life cycle costs of 1,367,000. The project would produce $225,000 in net NED benefits annually and would have a B/C ratio of 1.2.

As with any engineering project, there is a certain level of risk and uncertainty associated with the Selected Plan. The following is a brief description of the risk and uncertainty associated with the selected plan, which would increase the conveyance capacity of Lower Mission Creek up to 3400 cfs:

- There is a 42% chance that the channel capacity will be exceeded in 10-years.
- There is a 74% chance that the channel capacity will be exceeded in 25-years.
- There is a 94% chance that the channel capacity will be exceeded in 50-years.

B. *Plan Description*

The architectural drawings (Exhibit 9) and the engineering plans (Exhibit 7) found at the end of the Main Report show the details of the Recommended Plan.

Since the Draft Feasibility Report, several changes to Alternative 12 have been made part of the recommended plan. The changes were made based on inputs and comments from the public, local governments, sponsor, resource agencies, and within the Corps. These structural changes were incorporated to mitigate, minimize and or avoid cultural resources impacts and biological impacts particularly to the Federally listed species; steelhead and tidewater gobies. Maintenance of the added features is also addressed. These changes are included in the following plan description.

General

The flood control improvement plan would increase the creek capacity to 3,400 cfs and would provide approximately a 20-year level of protection. The project covers approximately the last mile of Mission Creek between Canon Perdido Street Bridge at the upstream end, and Cabrillo Boulevard Bridge near the outlet (Exhibit 1. Location Map). The improved creek would generally follow the existing alignment. The natural creek bottom would be maintained and in some areas existing concrete bottom would be removed and restored to natural. The improvements to the creek would include creek widening, replacing bridges, streamlining bedslope, stabilizing and protecting creek banks using vertical walls and vegetated riprap sideslopes, and installing an overflow culvert that bypasses the oxbow between Highway 101 and the Chapala Street Bridge.

Several land parcels along the stream banks would be designed and planted to expand the corridor of riparian habitat. Additional structural features would be implemented to avoid and mitigate impacts to biological resources. These features include installing fish ledges, Goby current refugia (goby hideouts), fish baffles, boulder clusters and a weir structure at the inlet of the overflow culvert.

Major Design Elements of the Project

Bank Protection Schemes

The existing bank protection would be replaced with either a vertical wall or a combination vertical wall (toe wall) and vegetated riprap sideslope.

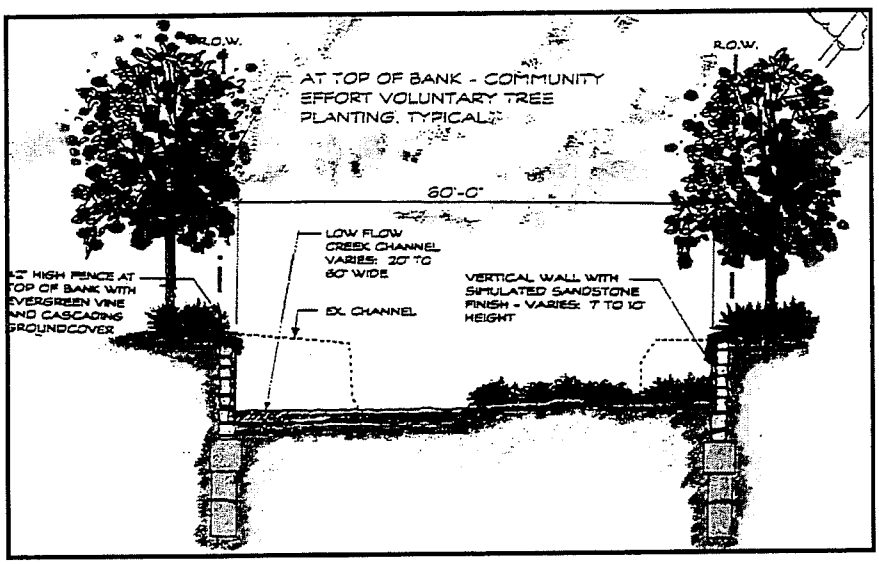


Figure 2. Vertical Wall on Pier Footing Representative Cross Section

The combination toe wall and vegetated riprap sideslope would consist of vertical wall at the bottom half, while the upper half would be sloped and covered with riprap and topsoil.

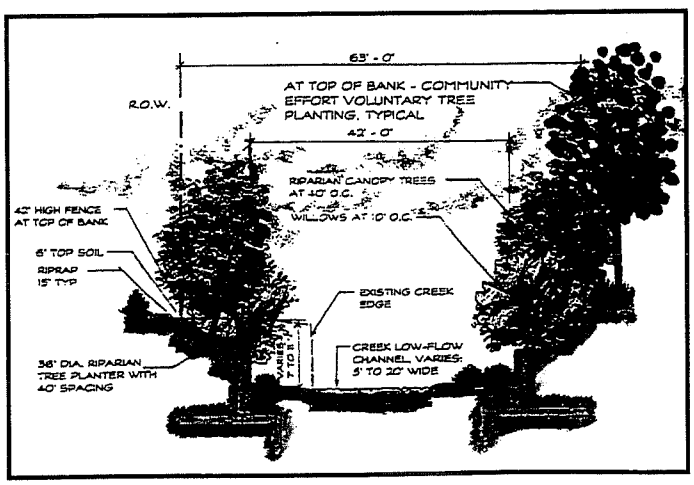


Figure 3. Vegetated Riprap Sideslope on Inverted "T" Footing Representative Cross Section

Concrete pipes in varying sizes (up to a maximum of three feet in diameter) would be strategically placed in between the riprap sideslope to allow planting of native trees and vegetation. This design is intended to help restore the major elements of the riparian corridor along the project reach. Aesthetic treatment of the exposed wall surface would be incorporated into the project design to minimize the visual impacts of the vertical walls. Wherever the combination toe wall-riprap sideslope is used, the height of the toe wall would be approximately half the depth of the creek. The riprap sideslope would be built with a slope of 1.5:1.0 (H:V) at the steepest. Typical cross sectional illustrations of these designs are shown in Exhibit 2, Sheets 1-9.

Upstream of Highway 101, the combination riprap and vertical wall would be the predominant bank treatment, except in two short reaches just upstream of the Haley-De la Vina Bridge and the De La Guerra Bridge. Below Highway 101, the combination riprap and vertical wall would be applied along the southeast bank, starting from the midpoint between the Chapala and Mason Street Bridges down to the midpoint between the Mason and State Street Bridges. Vertical walls would be applied or maintained for the remainder of this reach.

The vertical walls would be constructed in two methods, according to their proximity to any existing structures. The first method would be the use of an inverted "T" footing (See Figure 3). This less expensive construction method would be applied in areas where sufficient rights-of-way are available, without directly impacting existing structures. In areas with limited rights-of-way and close proximity to structures, a pier footing construction design would be applied (See Figure 2).

Replacement of Existing Bridges

To increase the conveyance capacity of existing bridges up to the design flow of 3400 cfs, some form of minor modifications may be required. In four cases, removal and replacement of the entire structure would be needed to increase capacity. These bridges are Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges.

Weir Inlet and Overflow Culvert that Bypasses the Oxbow

The reach referred to, as the "oxbow" is where the sharpest bends of the creek within the project area are found. The oxbow runs the length of the creek between the Gutierrez and the Chapala Street Bridges, where the creek makes several sharp turns while crossing Highway 101, the Montecito Street Bridge, and Union Pacific Railroad before joining its most direct path to the Pacific Ocean (See Figure 17). The culvert (Two 15-foot wide by 6-foot high boxes) connecting both ends of the oxbow is referred to as the overflow culvert or the "oxbow bypass". The overflow culvert would follow a more direct path across the oxbow. It would begin upstream of Highway 101, cross the highway (where Caltrans had built a span to accommodate such a crossing to eliminate impacts to highway traffic), Montecito Street, and the railroad tracks before rejoining the creek along side the downstream end of Chapala Street Bridge (See Figure 4).

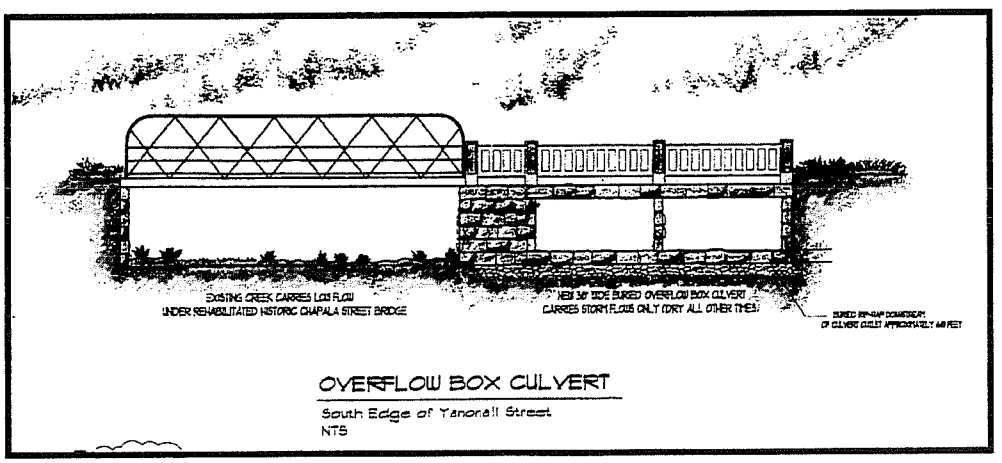


Figure 4. Outlet of Overflow Culvert Alongside Chapala Street Bridge

The culvert alignment would be far outside the Moreton Bay Fig tree dripline to minimize impacts to its major root system. The culvert would not be covered across Highway 101. However, it would be covered across Montecito Street to its confluence at the downstream end of the Chapala Street Bridge.

A weir structure (see Figure 5) would be built at the inlet of the culvert to control the flows across through the culvert and the oxbow. The height of the weir would be set in order to direct lower flows of up to 640 cfs through the oxbow. Also, the weir would split higher flows (up to the design conveyance capacity of 3400cfs) between the culvert and the oxbow.

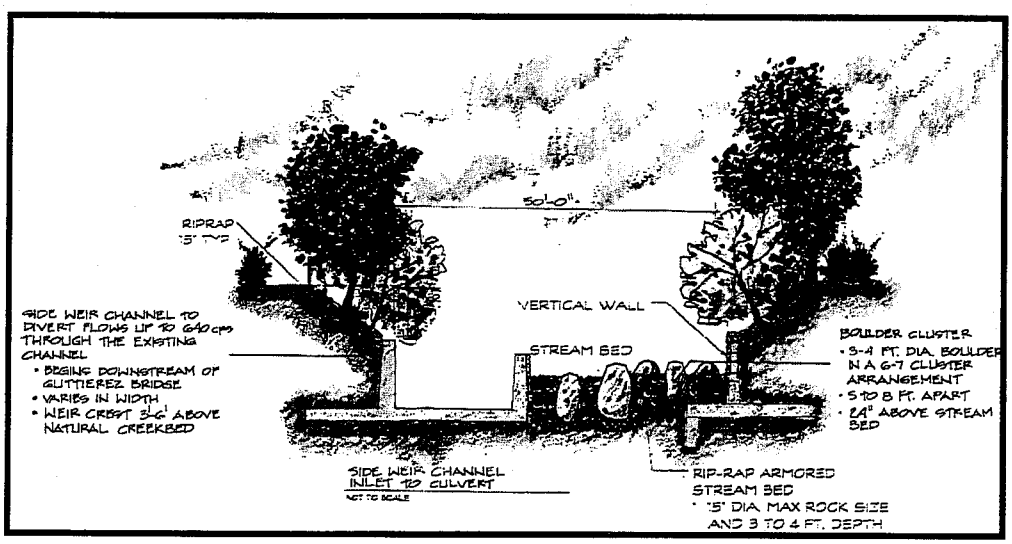


Figure 5. Representative Cross Section of Side Weir Channel Inlet to Overflow Culvert (Looking Downstream).

The culvert divider would be designed to form a "bullnose" and help minimize the potential of debris blockage.

Rocky Energy Dissipaters and Boulder Clusters

In areas where undesirable high velocity flows could be expected, the streambed would be armored with riprap and boulders (see Figure 6).

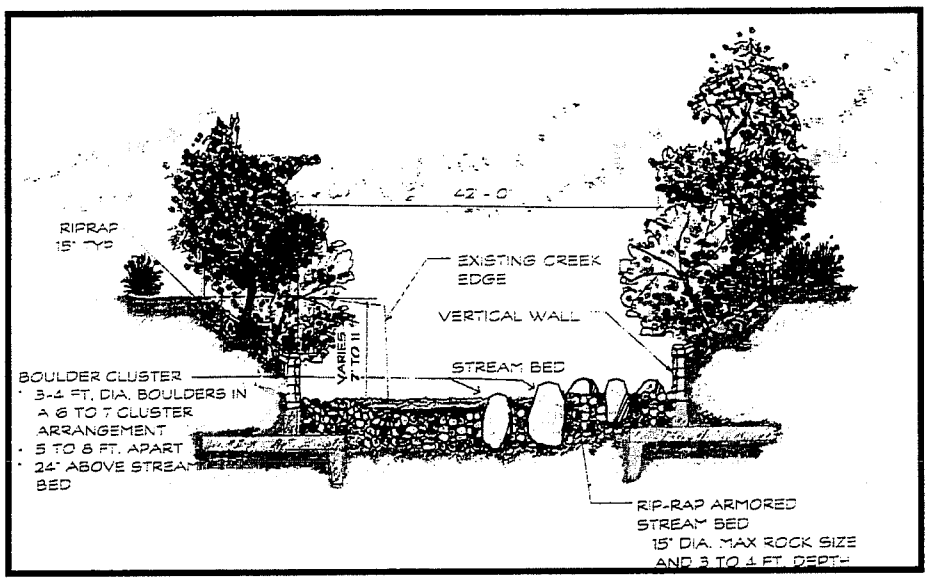


Figure 6. Representative Cross Section of Rocky Energy Dissipaters and Boulder Clusters

These fields referred to as Rocky energy dissipaters would be located in three reaches (See Exhibit 7. "Engineering Plans", Sheets 21-25). The more upstream field would be placed from Canon Perdido Street to below the De La Guerra Street Bridge. The second would extend from upstream of the Gutierrez Street Bridge downstream to the upper bend of the natural oxbow, near US WHY 101. The third would be at the outlet of the overflow culvert. Clusters of large boulders would be embedded into the riprap fields at the first two locations. The rock energy dissipaters and the boulder clusters would have two functions. First, they would dissipate the force of currents at vulnerable places along the creek. Second, they would impart natural turbulence and heterogeneity to the stream as a means to improve the aquatic habitat for steelhead (*Onchoryhncus mykiss*), an endangered species known to migrate through this reach of Mission Creek.

Expanded Habitat Zones

Five small parcels of open land would be left along the banks after completion of project

construction. These parcels range in sizes between 0.03 and 0.52 acres (See Exhibit 8- "Architectural Drawings"). Final calculations for the channel's configuration will determine the availability of all four of these parcels. If these open land parcels are available, each would be designed to serve a dual purpose: to expand the corridor of riparian habitat to be planted along the stream banks and to provide for passive park space for area residents (See Figure 7). Native trees, primarily western sycamores, cottonwoods, and coast live oak, from local nursery stock would be planted in the habitat expansion zones. In time, their canopies would form dense clusters on the overbank and adjacent to the stream corridor. In some of these zones, pathways and benches might also be added to create passive park spaces.

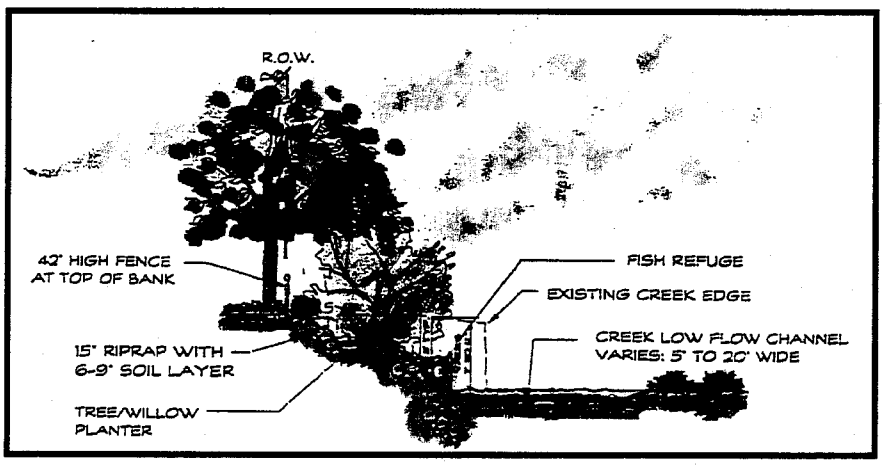


Figure 7. Representative Cross Section of a Habitat Expansion Area

Planting along the riprap and planting of native trees in habitat expansion zones are an integral part of the project design. The ecological values generated by these features would offset the impacts from the implementation of the proposed alternative on existing biological resources.

Structural Features to Mitigate and Avoid Impacts to Biological Resources

Several structural features would be included to avoid and mitigate impacts to biological resources. These permanent and durable mitigation features would create hiding places where fish may take refuge. They would be composed of three separate structural elements formed by coarse surface relief of the walls (goby refugia), artificial overhangs projecting from the walls (fish ledges), and

placing double rows of coarse boulders (fish baffles) between the overhangs along the creek walls (See Figure 8a. "Goby Refugia, Fish Ledges and Fish Baffles Along the Walls in the Estuary (Between Mason Street and Cabrillo Boulevard)"). In combination, they should provide shelter for fish of all sizes.

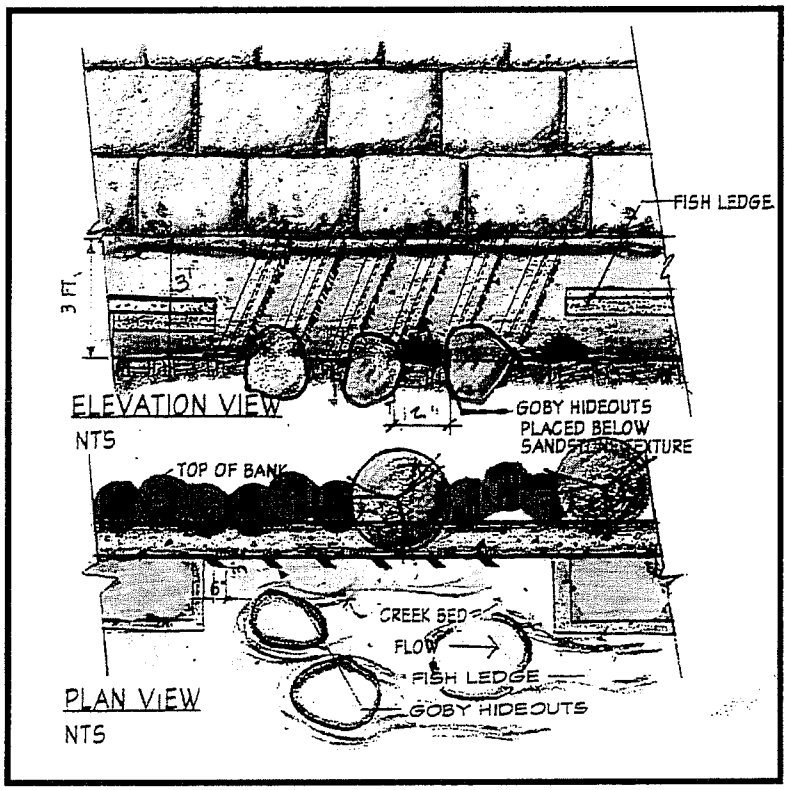


Figure 8a. Goby Refugia, Fish Ledges and Fish Baffles Along the Walls in the Estuary (Between Mason Street and Cabrillo Boulevard)

The combination of these three features would be used within the estuary between Mason and Cabrillo Street Bridges. The fish ledges and the fish baffles would be used for the remainder of the project reach. The locations of these features are shown on Exhibit 7. "Engineering Plans", Sheets 21-25.

The Goby refugia where gobies and other small fish could escape strong currents would be made in a pattern of slanted ribs as illustrated. These molded ridges would extend from the ordinary high water mark to the bottom of the formed wall, roughly eight feet in vertical length. Most of the time water in the estuary would cover them completely and each would extend well below the streambed.

Lower velocity and localized eddy currents would exist around these ribs, primarily caused by the effects of protruding ribs on the boundary layer adjacent to the wall itself. Small fish the size of gobies would easily find the recesses on their downstream side and take advantage of the refugia from currents created by these mitigation structures.

The second component of structural mitigation features, intended primarily for steelhead and other large fish, would consist of projecting ledges (fish ledges). The ledges would cantilever from the wall 2 feet into the flow, be 6 inches thick, and roughly 50 feet long typically. Within the estuary, cantilever ledges would be built at varying heights, say 10 to 20 inches, above the invert of the streambed and substantially below the ordinary high water level. Water would cover these ledges at all times except during the lowest low tides and all fish could easily swim beneath them.

The space between successive fish ledges allows a third mitigation measure. A double row of large, angular rocks would be nestled together and placed against the wall at the foot of the ribs. Ranks of boulders would extend into the creek about 5 feet from each wall. The innumerable crevices, voids between rocks, and spaces between rocks and the wall itself formed in this orderly jumble would provide thoroughly natural habitat for small fish and invertebrates. A fraction of those spaces should prove large enough for steelhead smolt also to find shelter amongst the rocks.

Ribs, boulders, and ledges would line both sides of the estuary between Mason Street and Cabrillo Boulevard. All surfaces in this section of the project would have all three features intermixed, although a ledge on one wall would face ribs and boulders on the opposite wall (accompanying figure, where ledges are not drawn to scale length). Lengths of the walls allow 380 linear feet of fish ribs and boulders and 240 linear feet of overhanging ledges on the left hand side; 360 linear feet of fish ribs and boulders and about 300 linear feet of ledges on the right-hand side.

Fish Ledges upstream of Mason Street

Overhangs of like design would be placed along the riverine sections of the creek (including the length between Mason and Yanonali Streets, otherwise treated as the upper end of the estuary)

where currents should impinge against the wall and scour persistent holes under these ledges (See Figure 8b. "Representative Cross Section Showing Fish Ledges and Baffles along the Walls Upstream of Mason Street"). Adult steelhead would have access to these pools during upstream migration. All manner of aquatic animals would take advantage of these sheltered pools throughout the dry season.

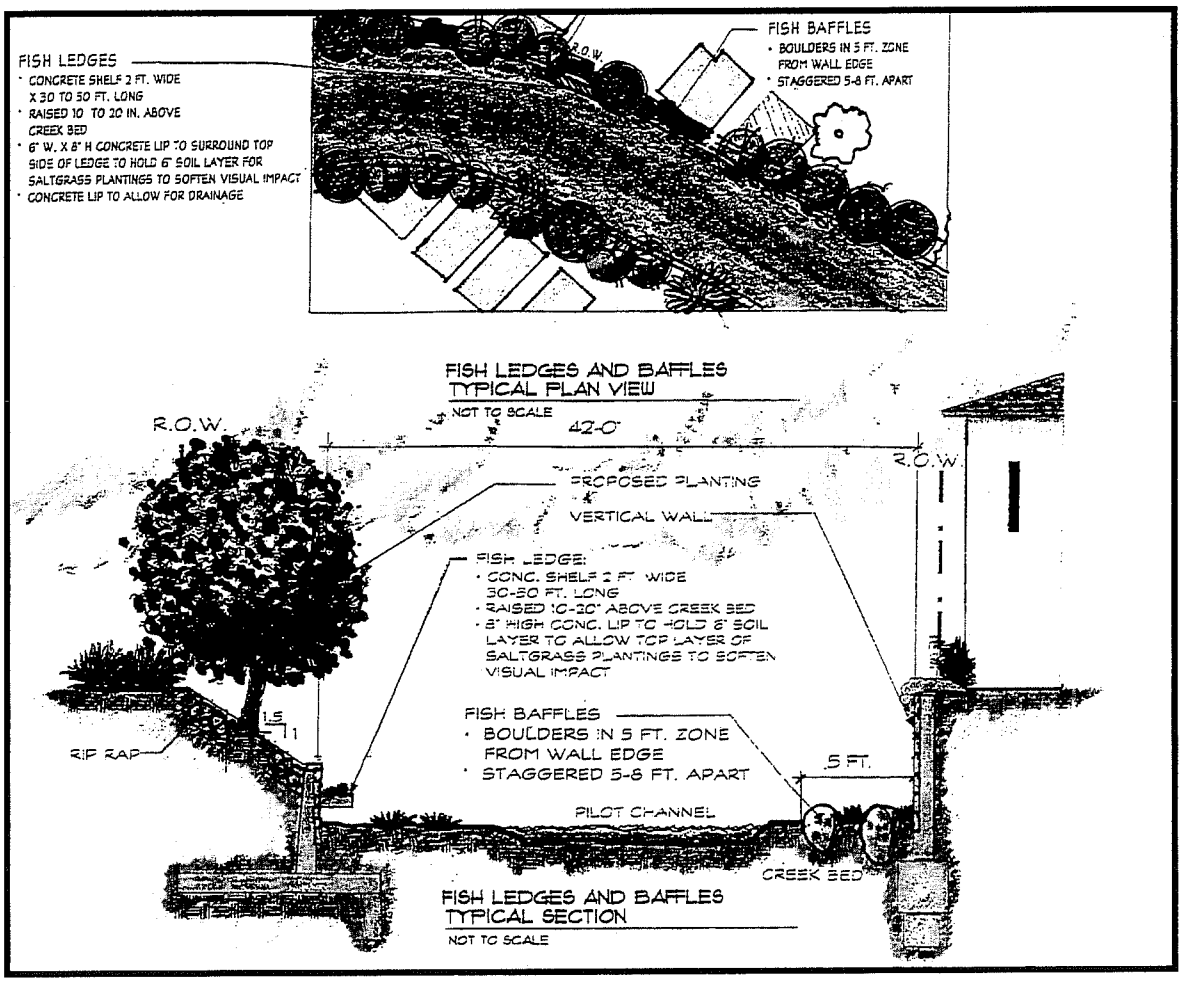


Figure 8b. Representative Cross Section Showing Fish Ledges and Baffles along the Walls Upstream of Mason Street

Walls on both sides of the creek would have them, placed as indicated by current patterns (locations are shown in Exhibit 7. "Engineering Plans", Sheets 21 through 25.). Four would be built along the left hand side (approximately 200 linear feet, in total) and five constructed against the right hand side (total of 250 feet in length).

Fish baffles upstream of Mason Street

Arrays of large boulders placed to the inside of walls ledges (See Figure 8b) would impart diverse flow patterns and a valuable measure of aquatic heterogeneity, lacking which the creek's streambed would mostly resemble an unrelentingly flat surface characterized by steady sheet flows. Their mass and position adjacent to the wall, and thereby within the boundary currents inherent to sides of the channel, would minimize the incidence of currents dislodging them.

Each baffle would consist of a rank of large rocks or derrick stone placed touching the inside surface of the walls, with a second rank inside the first and closer to the creek. Rocks would stand proud of the streambed by 18 to 24 inches. Together, the two ranks would extend inward toward the creek approximately 5 feet. A space of 5 to 8 feet would separate individual rocks, or perhaps pairs of boulders, to facilitate periodic removal of sediments from between them.

Fish baffles would occupy locations in lower velocity sections of the creek, on one side or the other as appropriate to its curvature (locations are shown in Exhibit 7. "Engineering Plans", Sheets 21 through 25). In certain lengths of the creek side baffles would be placed along one side only, then for another length be built against the opposite side. Many baffles would extend along 150 feet of the creek's side, a few up to 200 feet in length, while others would be shorter by necessity. Design restrictions prevent their placement beneath bridges, for a certain distance on the upstream side of bridge abutments, and directly opposite other baffles or ledges.

The creek's channel allows fish baffles to be interspersed with ledges as indicated by the prevailing direction of currents and streambed to encourage formation of varied stream features. Side baffles would be installed over approximately 1400 linear feet of the stream's edge; 675 linear feet of fish baffles on the left and 725 linear feet on the right side.

In-Stream Boulder Clusters

Baffle structures the full width of the streambed and 300 feet in length would combine clusters of large boulders and fields of riprap at two locations; immediately upstream and downstream of the De la Guerra and Gutierrez Street Bridges as shown in Exhibit 7. "Engineering Plans", Sheets 21

through 25.

Stone used for riprap would be as large as15 inches in diameter and of angular character. Larger boulders, essentially individual derrick stones of 3 to 4 feet diameter each, would be set down into the surrounding riprap, placed 5 to 8 feet apart, and arranged in clusters of 6 to 9 individual boulders. Tips of the rocks would protrude 1½ to 2 feet above the streambed

The boulder patches would constitute islands of very coarse and permanent streambed irregularities. Upstream of them, Mission Creek would tend to flow as a homogenous, single current. By their placement, these clusters ought to disrupt that flow regime and induce smaller and intertwined subcurrents. These many smaller currents should continually reshape the longitudinal profile over the length of the baffles fields and downstream of them for some way.

Each cluster of boulders would naturally form various internal cross currents and protected patches of water. Placement of clusters within the baffle (Figure 3 and 4) is intended to promote the variety of water conditions trout seek out in natural streams, so clusters would be placed to outline a sinuous and meandering predominant channel, one that shifts back and forth across the streambed.

Additional Design Opportunity

An opportunity exists to construct another habitat expansion zone in the vicinity of the oxbow formation area just upstream of Highway 101. The total area to be created would be about 0.6 acres (approximately 25,800 square feet). See Exhibit 8 – "Architectural Drawings", Sheet 4 for location. The construction of this feature would provide additional ecological benefits. However, its construction would be subject to cleanup of the existing known contamination on the site (see details in Section 15, HTRW of the DEIS/EIR). If, prior to the completion of project construction, the designated site is remediated, then the habitat expansion zone would be constructed as planned.

Detailed Description of Creek Improvements Along the Entire Project Reach

The detailed improvements described in the following sections are segmented between successive bridge crossings. For orientation, the left and right banks are described while facing downstream (right would be towards the west and left towards the east). The creek generally flows southeasterly as it heads towards the Pacific Ocean. Reference station markings to Exhibit 7, "Engineering Plans", Sheets 13 through 16.

Canon Perdido Street Bridge to De La Guerra Street Bridge (Station 61+36 to 57+00):

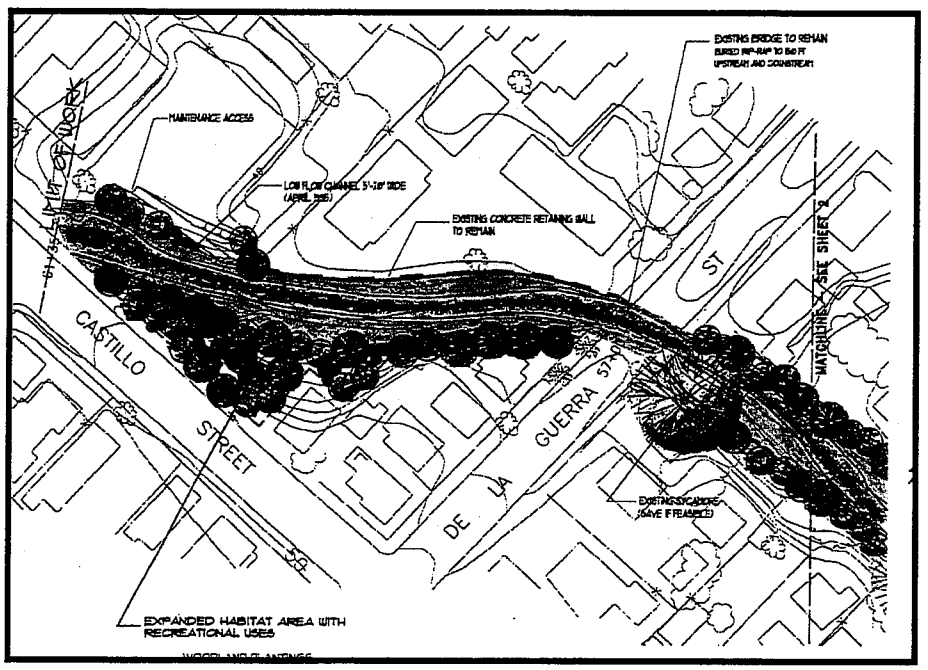


Figure 9. Canon Perdido and De La Guerra Street Bridges (Upstream End of the Project)

Canon Perdido Street Bridge marks the upstream boundary of the project. Immediately upstream of this bridge is an existing channelized portion of the creek, which conveys flows at high velocities into the project area. Between Canon Perdido Street and De la Guerra Street, the creek would be 63 feet wide with an average depth of 7.5 feet. The right bank would mostly consist of the toe wall and riprap sideslope, except for the section just upstream of De La Guerra Street Bridge, where vertical wall would be used. The left bank would maintain the existing retaining wall along the last two-thirds of its length; the upstream remainder of the left bank would consist of vertical wall-riprap sideslope. A maintenance access ramp would be incorporated on the left bank. A habitat expansion area would be created on the creek terrace along Castillo Street. The creek bed along this reach would be armored with riprap and boulder clusters to act as energy dissipaters.

De la Guerra Street Bridge to Ortega Street Bridge (Station 57+00 to 52+30):

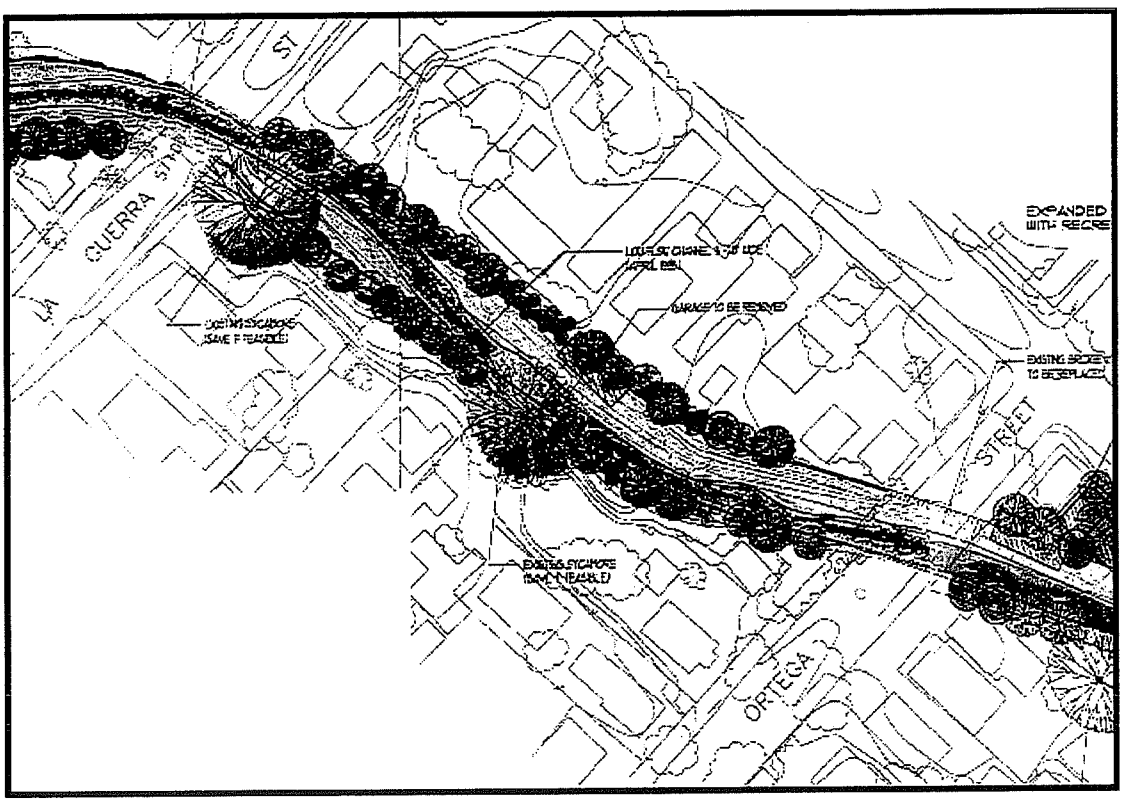


Figure 10. De La Guerra Street Bridge to Ortega Street Bridge

The creek would be 63 feet wide along this reach with both banks consisting of toe wall and riprap sideslope, except for a short reach on the left side immediately upstream of the Ortega Street Bridge where full height vertical walls would be used to avoid impacting a culturally significant structure. This reach would have an average depth of 9 feet. The invert slope would be streamlined, necessitating excavation and removal of one to four feet of streambed. Approximately 150 feet of streambed immediately downstream the Ortega Street Bridge would be armored with riprap and cluster of boulders to act as energy dissipaters. A parking structure located along the left bank at station 54+00 would be removed to accommodate the required wider channel. The Ortega Street Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow.

Ortega Street Bridge to Bath Street Bridge (Station 52+30 to 49+00):

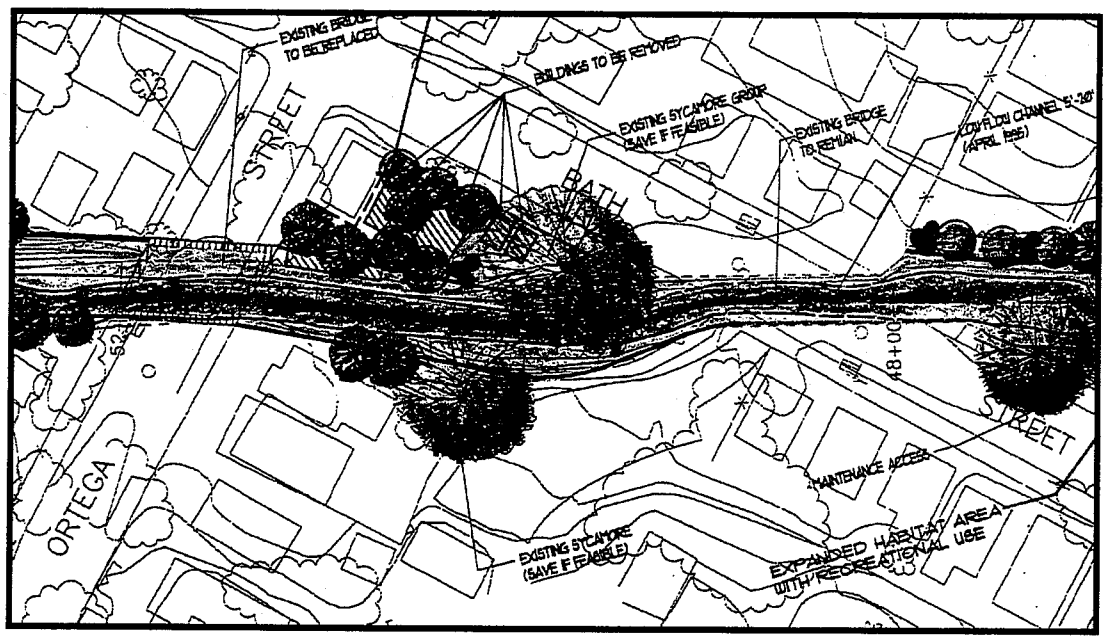


Figure 11. Ortega Street Bridge to Bath Street Bridge

The creek would be 63 feet wide along this reach with both banks consisting of vertical wall-riprap sideslope averaging 9 feet in depth. The invert slope would be streamlined, necessitating excavation and removal of one to three feet of streambed. Three residential properties and two garage structures located along the left bank would be removed to allow for creek widening. The only structure that would remain on the left side is located at the corner of Bath and Ortega Streets. The Bath Street Bridge would remain in place and would convey the design flow. The remnants of the acquired properties would be planted with native trees and vegetation, thus creating a habitat expansion zone and, possibly, a passive park space.

Bath Street Bridge to Cota Street Bridge (Station 49+00 to 46+00):

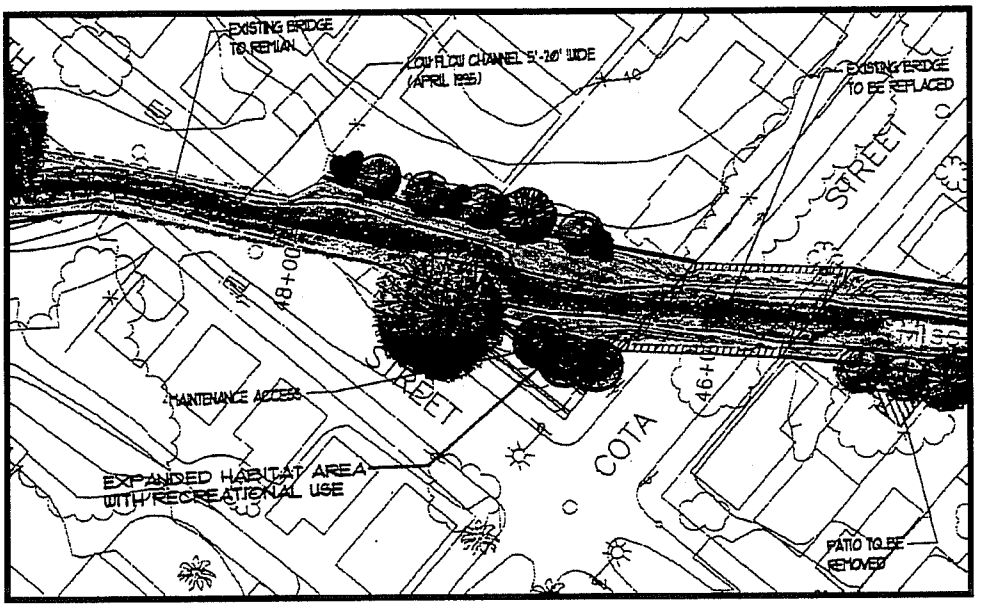


Figure 12. Bath Street Bridge to Cota Street Bridge

This short reach occupies the northeast corner of Cota Street and Bath Street intersection. The creek would be widened to 63 feet. The left bank would be protected with a vertical wall. On the right side, the existing maintenance access ramp fronting Cota Street would be kept in place. Cota Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow.

Cota Street Bridge to Haley-De la Vina Bridge (Station 46+00 to 39+00):

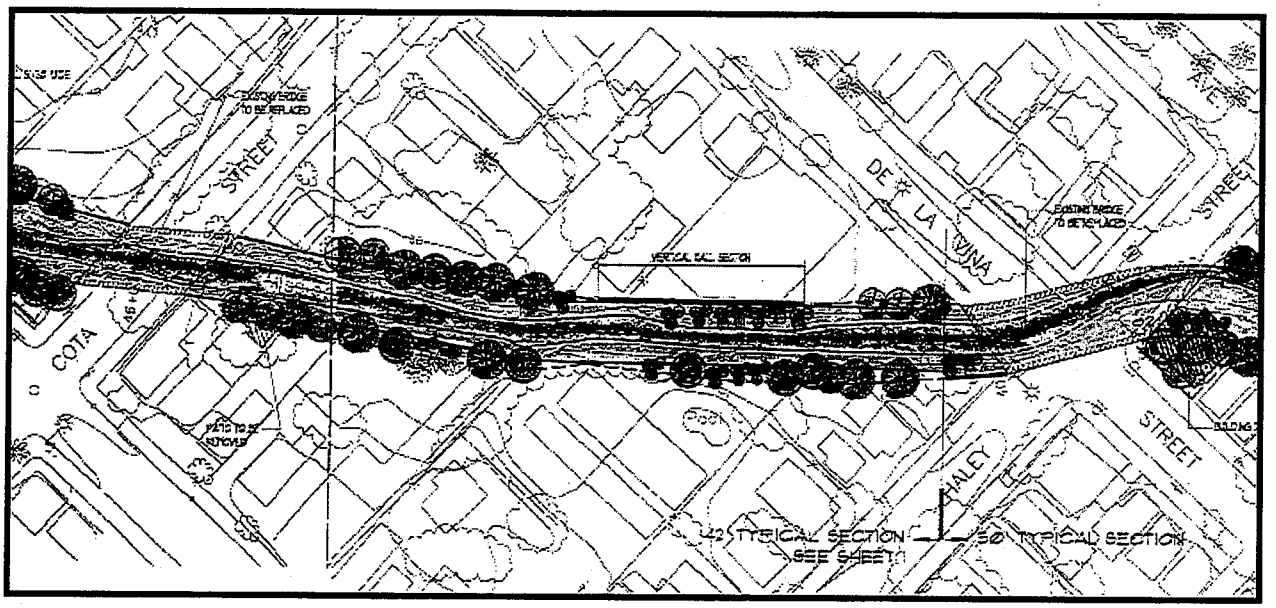


Figure 13. Cota Street Bridge to Haley-De la Vina Bridge

The upper half of this reach (Cota Street Bridge to Station 43+00) would be 63 feet wide with both sides consisting of vertical wall-riprap sideslope, except for a short reach immediately downstream of the Cota Street Bridge where vertical walls would be used to preserve a culturally significant structure. On the downstream half of the left side, the bank protection would transition from a toe wall-riprap sideslope into a vertical wall across the multi purpose property (Apartment and Hardware store) located between Station 43+30 and 41+70, where the width would narrow to 55 feet. The invert slope would be streamlined, necessitating excavation and removal of two to three feet of the streambed. This reach would have an average depth of 9 feet. A patio deck located on 532 Bath Street would be removed, to allow for creek widening. The Haley-De la Vina Street Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow.

Haley-De la Vina Bridge to Gutierrez Street Bridge (Station 39+00 to 34+00):

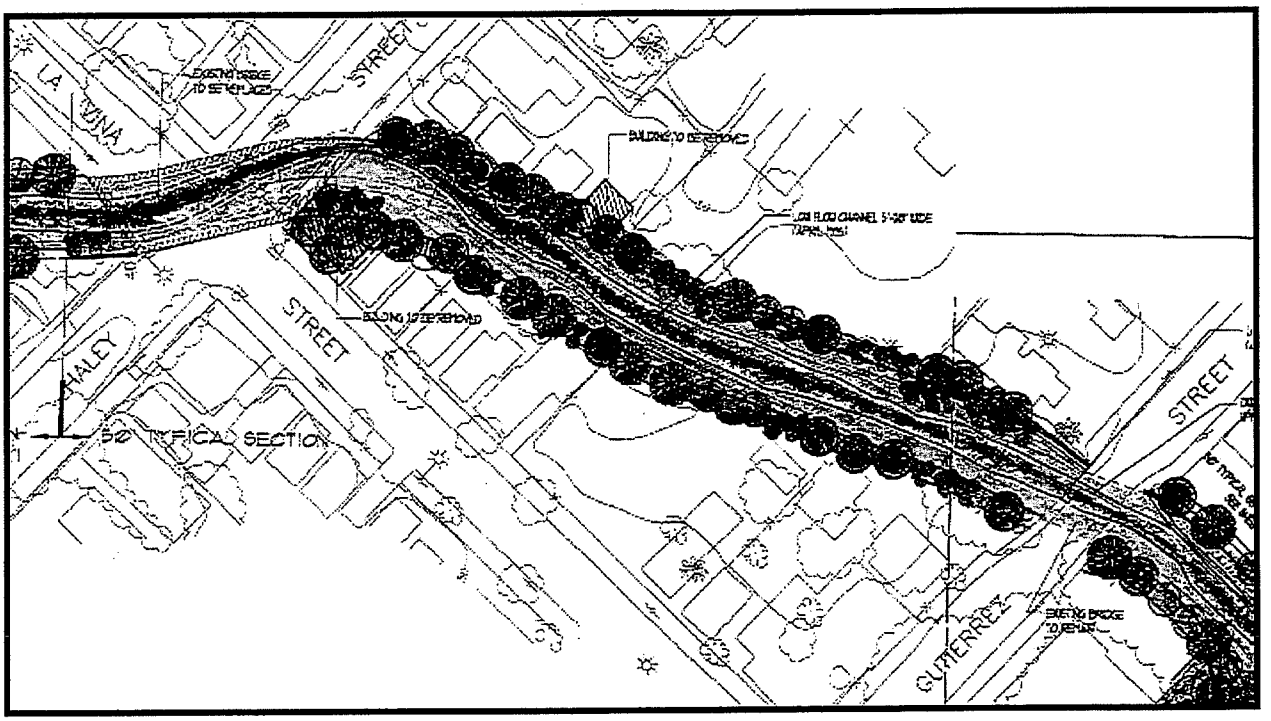


Figure14. Haley-De la Vina Bridge to Gutierrez Street Bridge

The creek would be 71 feet wide along this reach with both banks consisting of the toe wall-riprap sideslope, except for a short reach on the east side immediately upstream of the Gutierrez Street Bridge, where a vertical wall would transition the east bank into the bridge. The reach would have an average channel depth of 9 feet. The invert slope would be streamlined, necessitating excavation and removal of two to four feet of streambed. Two residential properties located at 434 De la Vina Street and at 119 West Haley Street (Parcel Number 037-203-02) would be removed to allow for creek widening. The remnants of the 434 De la Vina Street property would be planted with native trees and vegetation, thus creating a habitat expansion zone and, possibly, a passive park space. Approximately 150 feet of streambed immediately upstream the Gutierrez Street Bridge would be armored with riprap and cluster of boulders to act as energy dissipaters.

Gutierrez Street Bridge to Highway 101:

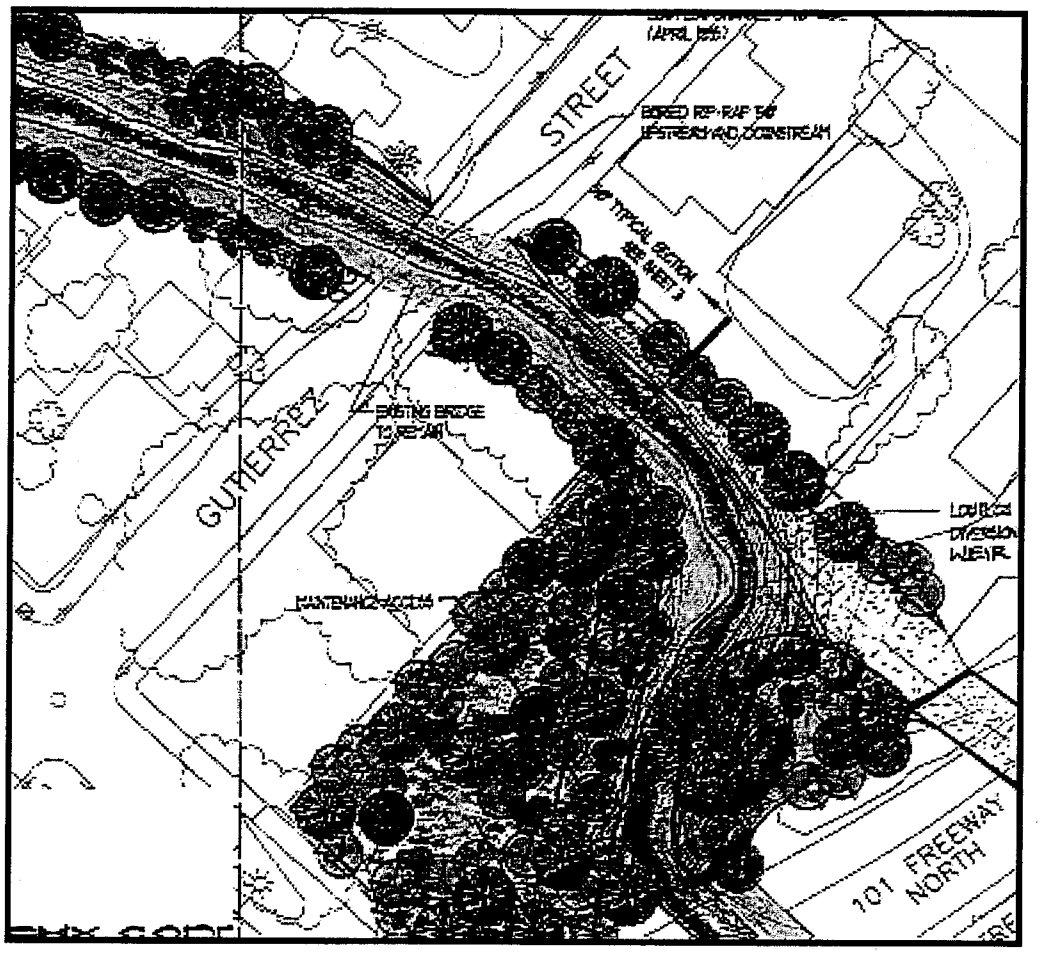


Figure15. Gutierrez Street Bridge to Highway 101

The reach from Gutierrez Bridge to Station 32+50 (beginning of Caltrans property) would continue to be 71 feet wide with banks consisting of the toe wall-riprap sideslope. A low flow diversion weir would run along the left side and connect to the overflow culvert near the upstream face of Highway 101. The depth of the creek along this reach would average about 9 feet. The toe wall-riprap sideslope on the right bank would terminate just inside the Caltrans property line, about 120 feet downstream of the Gutierrez Street Bridge. The remaining section of the right bank would be protected entirely with riprap. Approximately 150 feet of streambed immediately downstream the Gutierrez Street Bridge would be armored with riprap and cluster of boulders to act as energy dissipaters. The rest of the Caltrans lot adjacent to the creek would be created into a habitat expansion area.

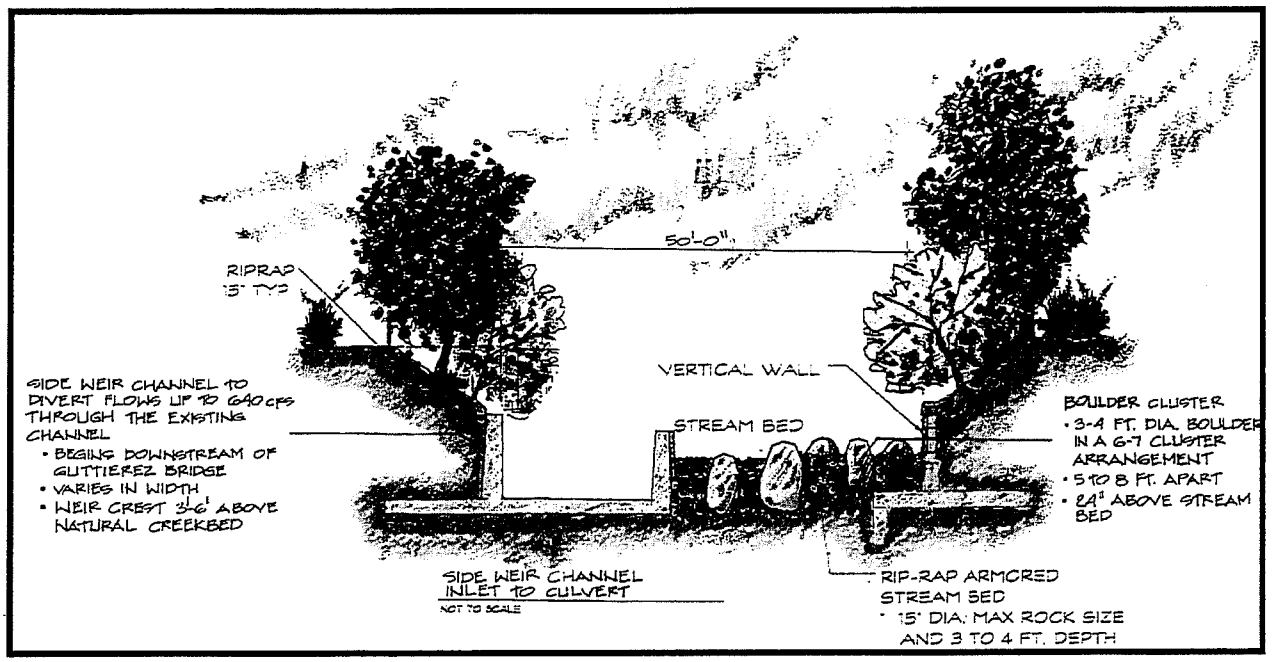


Figure 16. Representative Cross Section of the Side Weir Channel Inlet to Overflow Culvert

The higher flows across this reach would be divided between the existing channel (oxbow) and the overflow culvert. The oxbow would continue to convey the base flow and low-discharge events up to 640 cfs (equivalent to an event with 2.3-year return interval). During larger events, the new culvert would be expected to carry two-thirds of the design capacity, while the remaining third would be conveyed by the oxbow. No modifications would be needed for the oxbow between Highway 101 and the Chapala Street Bridge.

New Overflow Culvert that Bypasses the Oxbow between Highway 101 and Chapala Street Bridge:

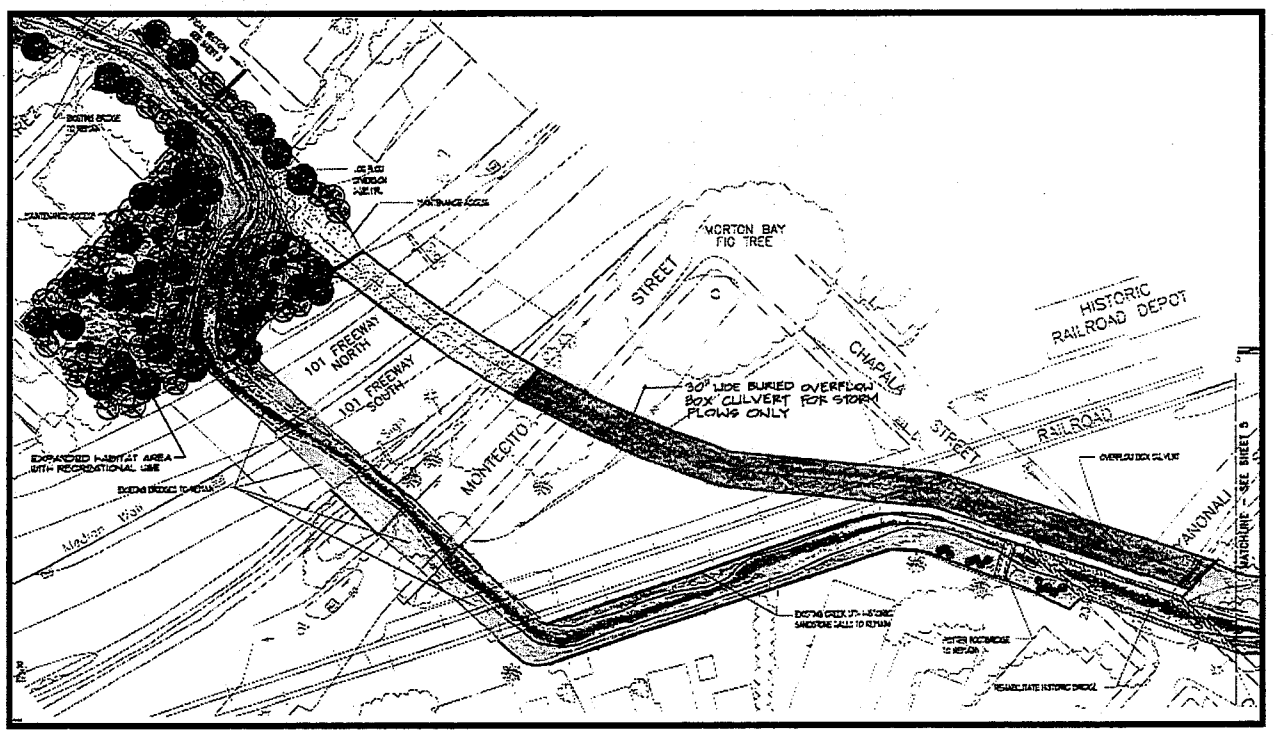


Figure 17. New Overflow Culvert that Bypasses the Oxbow between Highway 101 and Chapala Street Bridge

Across the existing opening underneath Highway 101 (built by Caltrans in the 1980s), the new culvert would be a pair of 15 foot wide by 6 foot high open channels. Below Highway 101, the culvert would be covered before it crosses Montecito Street and until it terminates alongside the downstream end of the Chapala Street Bridge. The open channel would be approximately 200 lineal feet while the covered section would be approximately 640 lineal feet. The covered portion of the culvert would cross under the Amtrak passenger platform before crossing under the railroad tracks. The box would remain covered as it runs along the left side of the sandstone channel. It would continue alongside the Chapala Street Bridge and terminate at the downstream end of the bridge. Approximately 50 feet of streambed immediately downstream the overflow culvert outlet would be armored with riprap to act as energy dissipaters. In order to avoid any potential impacts to the Moreton Bay Fig tree, the culvert is aligned approximately 50 feet outside of its dripline.

Chapala/Yanonali Street Bridge to Mason Street Bridge (Station 25+00 to 17+00):

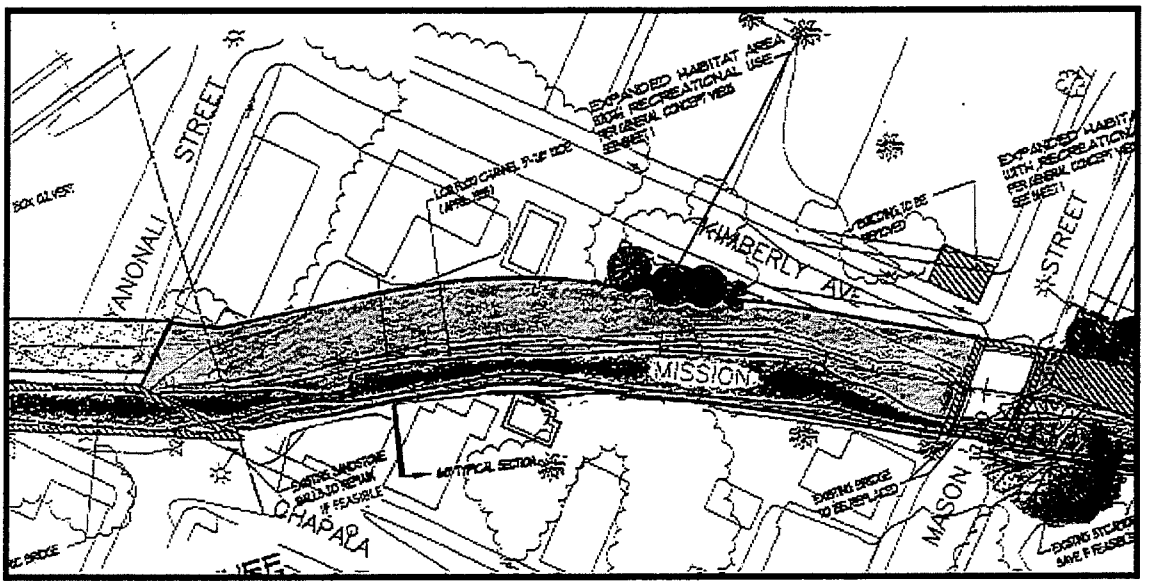


Figure 18. Chapala/Yanonali Street Bridge to Mason Street Bridge

The creek banks would be predominantly vertical walls on both sides, except for approximately 120 lineal feet of the left (east) bank just upstream of the Mason Street Bridge. This portion would be protected by the tow wall-riprap sideslope. The riprap slope will be laid back to cover the entire parcel and create an expanded habitat zone. The creek would be 60 feet wide between the vertical wall sides and 71 feet wide where the toe wall-riprap sideslope is used. This reach would have an average depth of 7.5 feet. The invert slope would be streamlined, necessitating excavation and infill of about one foot of streambed. The Mason Street Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow. In order to widen the creek and rebuild the bridge, Kimberly Avenue would be partially realigned, which requires the removal of the commercial structure (APN 033-075-006) located at the corner of Kimberly Avenue and Mason Street.

Mason Street Bridge to State Street Bridge (Station 17+00 to 12+50):

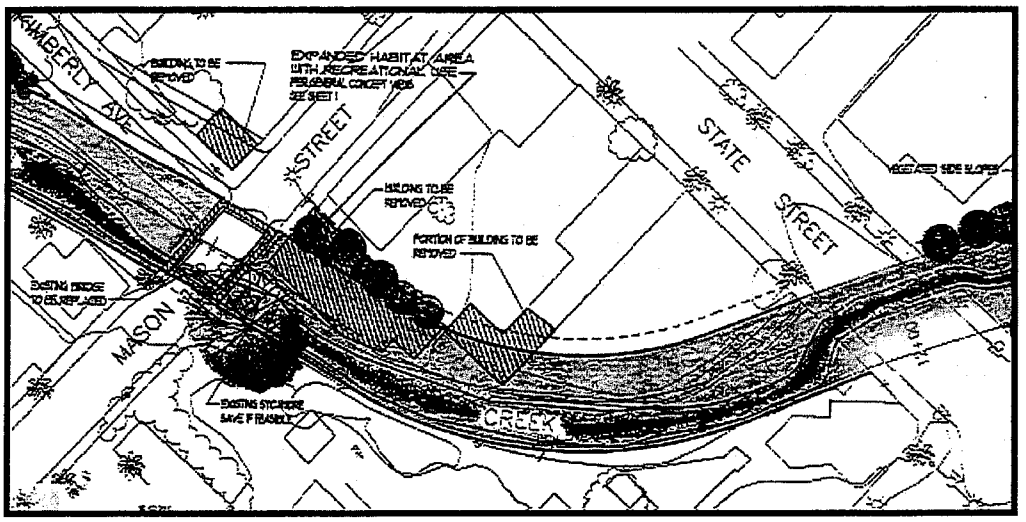


Figure 18. Mason Street Bridge to State Street Bridge

The creek banks would be predominantly vertical walls between Mason and State Streets, except for the left bank immediately downstream of the Mason Street Bridge, which would consist of the toe wall-riprap sideslope. The property located at 15 W. Mason Street would be removed to allow for widening of the creek. The remainder of this lot would be planted with native trees and vegetation, thus creating a habitat expansion zone and, possibly, a passive park. Another structure located on 29 State Street would be partially removed. The remainder of this structure would continue to function as a commercial establishment. The creek would be 60 feet wide between the vertical wall sides and 71 feet wide where the toe wall-riprap sideslope is found. The average depth along this reach would be 8 feet. The invert slope would be streamlined, necessitating excavation or fill averaging one foot in depth. The State Street Bridge would remain to convey the 3400-cfs design capacity.

State Street Bridge to Cabrillo Boulevard Bridge (Station 12+50 10+15):

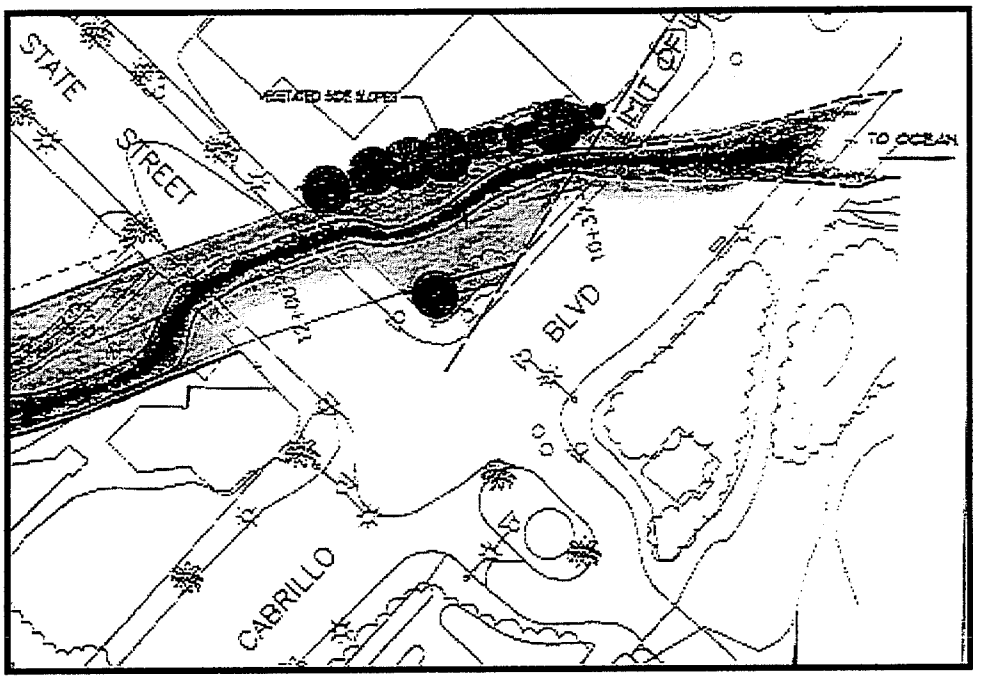


Figure 19. State State Street Bridge to Cabrillo Boulevard Bridge

The banks across this short span, located at the corner of State Street and Cabrillo Boulevard, would consist of the toe wall-riprap sideslope. The invert would be cleared of leftover footings from earlier structures. The creek would be widened to approximately 65 feet and is not expected to have any impacts on the adjacent structures. Cabrillo Boulevard Bridge would remain in place and convey the 3400-cfs design capacity. This is essentially the downstream boundary of the project and any associated construction activities. The lagoon is located immediately downstream of the Cabrillo Boulevard Bridge, a short reach before the shoreline of the Pacific Ocean.

Removal of Existing Bank Protection and Earthen Material

The creek bottom and banks for about a mile, between the Canon Perdido Street and Cabrillo Boulevard Bridges, would be excavated to increase the creek capacity to provide an approximately 20-year level of flood protection to the City of Santa Barbara. The removal of all existing banks would occur within the project reach, except for a retaining wall located just upstream of the De La Guerra Street Bridge, and along the oxbow between Highway 101 and the Chapala Street Bridge (Oxbow reach). The excavation of the channel would begin from the downstream end of the project near Cabrillo Boulevard and progress upstream.

The total amount of material to be excavated from creek banks and creek bottom would be about 82,000 cubic yards (cy). Excavated material would be partially stockpiled in a staging area located along the creek bank and remaining material would be transported to disposal sites located within a radius of about 10 to 20 miles from the project site. Channel excavation may last for about 130 to 180 days; however, excavation and construction activities, including bank stabilization and construction of bridges etc., would be accomplished at the same time. The construction would be performed in segments. Therefore, the estimated time frame for project construction is about two years. In case of inclement weather conditions, mechanical failure, funding constraints, or environmental reasons, project construction may be prolonged for three to four years. It is expected that about 150 to 600 Cy of material would be removed each day. About 17,000 to 18,000 Cy of material would be utilized in project construction as fill material.

Creek excavation would occur section by section. Therefore, all 82,000 Cy of material would not be stockpiled at one time. About 3,000 to 4,000 Cy of material would be stockpiled along the creek banks or adjacent streets, which would be closed during the construction of that segment. The remaining approximately 64,000 Cy of excess excavated material would be disposed of either at the Tajiguas Landfill, located 10 miles north of the project site. If this landfill is not available to receive the project spoil and excess excavated materials during time of construction, another suitable site would be found. Often times there are opportunities that arise based on development activities at that time. A reclamation site would be used if one exists at the time of construction.

Existing riprap slope protection can be stockpiled for reuse or be taken to a county yard for storage and reuse depending on whether it meets project specifications. The unusable spoils would be disposed of at the Tajiguas Landfill or as described earlier. These disposal sites would be located within a distance of about 20 miles from the project site. All unusable debris would be disposed of, while the earthen material could be reused as backfill or cover for the riprap slope. Expected debris would include stacked burlap bags filled with concrete, large rocks, mortared riprap, slabs of concrete, grouted stone, jointed masonry walls, shot-crete walls, wire baskets filled with coarse rock (gabions), formed walls, wooden pilings, and other bank material found throughout the length of the project.

Operation and Maintenance

Perpetual maintenance of the creek is an integral part of the Recommended Plan (Alternative 12). To ensure and maintain its design function and form, maintenance would be needed on a regular basis. Future maintenance activities would be associated with the earthen creek bottom, channel walls, creek banks and vegetation, overflow culvert, interior drainage, habitat expansion zones, rocky energy dissipaters, and other appurtenances.

Impact analyses of future operation and maintenance for the life of the project have been included for each resource and addressed in Chapters 6 through 19 of the EIS/EIR. Mitigation measures for future operation and maintenance for the life of the project are also included in the EIS/EIR. Conditions identified in the EIS/EIR would be followed during each operation and maintenance activity.

It is estimated that the average frequency of sediment removal would be as often as once a year. However, when several low-flow years occur sequentially, sediment removal might occur every two to three or more years. Any areas where sediment deposition and/or vegetation growth occur significantly as to impair the designed conveyance capacity of the creek, clearing shall be performed

as soon as possible to restore the creek to its design function and form. The expected maintenance of the creek are addressed in the following sections:

Stream Bed Maintenance

Inspection and maintenance of the streambed would address vegetation control, fish baffles, rocky energy dissipater and boulder fields, desilting, and shaping. Vegetation control would be accomplished by either brushing, spraying, or clearing. Clearing could be done using a mechanical equipment such as a dozer. Partial removal of vegetation would occur yearly. The removal would follow a mosaic pattern, wherein one half the creek bed would be cleared while the other half would be cleared the following year. The alternate clearing method would be repeated for the subsequent years. Fish baffles, rocky energy dissipater and boulder fields shall be periodically inspected. Rip-rap or boulders designed to be placed within the streambed shall be replaced back into the intended design location, if removed or dislodged by any means. Maintenance for the Desilting and streambed shaping would typically be done with a dozer or loader. Typically accumulated sediment would be pushed to an area where the material can be loaded directly into trucks driving on the channel bottom or to an area where a crane (at the top of bank) can access the material, which could then be loaded into trucks and hauled to a suitable disposal site. It is possible that lesser amounts of sediment could be placed on the riprap slope.

Channel Wall Maintenance

Concrete sections of the channel improvements include decorative variable height concrete walls, goby hideouts on the estuary walls, fish ledges, approaches to bridges, and the cut stone channel between Montecito and Yanonali Streets. Inspection and maintenance of the channel walls, fish ledges, and the cut stone channel shall address the following:

- Cracking, chipping or breaking, and eroding of the concrete to an extent, which might affect the stability of the wall or its watertightness.
- Evidence of settlement, uplift, scour or failure of concrete structures shall be given special attention;

- Necessary steps shall be taken to prevent damage to, or loss of, backfill behind wall through settlement, unauthorized removal of soil and sloughing of soil from adjacent property; and
- Weep holes shall be cleaned on a regular basis. Accumulated debris shall be removed from the front of any weep holes.

Any adverse conditions encountered shall be repaired as soon as possible

Overflow Weir Structure

The overflow culvert to bypass high flows around the Mission Creek oxbow will be constructed under Highway 101 (station 25+09 to 30+40). The culvert will be an approximately 34' wide (including wall thickness) with a divider wall down the center. A weir will be constructed at the upstream end of the culvert (station 31+00 to station 33+10). The weir will direct lower flows into the oxbow. Higher flows will go over the weir and into the culvert. Inspection and maintenance of the channel walls and the cut stone channel shall address the following:

- Cracking, chipping or breaking, and eroding of the concrete to an extent, which might affect the stability of the culvert or its watertightness.
- Evidence of settlement, uplift, scour or failure of concrete structures shall be given special attention;
- Weep holes shall be cleaned on a regular basis. Accumulated debris shall be removed from the front of any weep holes;

Sediment and debris deposited within the culvert shall be removed. Sediment removal shall be conducted by pushing the accumulated sediment to the inlet and/or outlet where the material can be removed with a crane or excavator.

Any adverse conditions encountered shall be repaired as soon as possible.

Vegetated Riprap Slope Banks and Other Appurtenances

Channel banks above the vertical concrete walls shall be constructed of 15" rip-rap on 1.5:1 slopes with 6" of fill over the rip-rap. Planting pockets (vertical concrete pipes) would be included for various trees and shrubs to provide habitat and ultimately develop a canopy, which would shade the creek bottom. Inspection of the creek banks shall address the following:

- The growth rates of the trees and shrubs shall be documented for 5 years. As outlined in the Environmental Commitments discussed in the EIS/R. If the plants do not meet pre-determined growth rates, actions shall be taken to improve growing conditions such as fertilization and increased irrigation;
- Trees and shrubs that do not survive shall be replaced as soon as possible with local nursery stocks;
- Rip-rap shall be periodically inspected. If rip-rap is removed or damaged by any means to the extent that the integrity of the project is compromised, it shall be replaced;
- The layer of fill over the rip-rap shall be maintained to encourage understory growth. Periodical soil augmentation on the banks may be accomplished by using deposited streambed sediment or imported soil from other areas. This will typically occur when earthen channel maintenance is required;
- Areas of the bank that are damaged by scour, erosion, or other means shall be replaced as designed as soon as possible. This includes the filter fabric, rip-rap, fill, and plants;
- Obstructive debris shall be removed from the creek banks;
- Non-native vegetation shall be controlled with herbicide and/or removed;
- Access ramps shall be kept clear of debris and obstructions. Grass shall be encouraged on the ramps. Gates at the access ramps shall be locked and kept in good working condition;
- Any damage to fencing and rails along the top of the creek banks shall be repaired as soon as possible; and

- Coordinate trash removal with local volunteer groups or other agencies.

Any adverse conditions encountered shall be documented in the District's Annual Maintenance Plan, the annual re-vegetation monitoring plan, or the annual report.

Habitat Expansion Zone Maintenance

Habitat Expansion Zones shall be created in the vicinity of stations 16+00, 19+00, 38+50, 51+00, and 60+00. Parcels ranging in sizes from 0.03 to 0.52 acres will be planted with native vegetation. The Habitat Expansion Zones will provide riparian habitat along the creek and also provide recreational areas for local residents. Inspection and maintenance of the channel banks shall address the following:

- The growth rates of the trees and shrubs shall be documented for 5 years. As outlined in the Environmental Commitments discussed in the EIS/R. If the plants do not meet pre-determined growth rates, actions shall be taken to improve growing conditions such as fertilization and increased irrigation. Trees and shrubs that do not survive shall be replaced as soon as possible with local nursery stocks;
- Non-native vegetation shall be controlled with herbicide and/or removed.
- Coordinate trash removal with local volunteer groups or other agencies.

Any adverse conditions encountered shall be documented in the District's Annual Maintenance Plan, the annual re-vegetation monitoring plan, or the annual report.

Interior Drainage

Drainage structures, such as stormdrains, are installed through the concrete channel walls and channel banks at strategic locations to pass interior drainage into the channel. The drainage structures such as pipes, headwalls, outlets, etc. shall be maintained to preserve their function.

Inspections

Santa Barbara Flood Control District staff in addition to representatives from regulatory agencies, the Corps of Engineers, and representatives from local public interest groups would conduct periodic inspections to ensure the project is being maintained properly. These inspections shall determine the condition of the various components of the project and disclose any areas that require repair, replacement, or maintenance. Inspections shall occur in the spring after the rainy season, in the fall immediately prior to the rainy season, and after major storms.

The recommendations set forth in this Maintenance Plan shall be incorporated as appropriate into an "Operations and Maintenance Manual" to be prepared by the Corps of Engineers during preparation of final plans for the proposed project.

VI. PLAN IMPLEMENTATION

A. Study Recommendation

The Selected Plan, Alternative 12 is a flood control project, which also contains positive environmental contributions. The Selected Plan provides the desired level of flood protection and affords acceptable environmental improvements and is recommended for implementation.

B. Cost Allocation

The Federal and Non-Federal responsibilities for construction, maintenance, and operation of water resource projects accomplished under the direction of the Corps of Engineers are based on the Water Resources Development Act (WRDA) of 1986 and other applicable administrative policies.

Cost sharing for this construction project would be in keeping with the current Corps policy whereby the non-Federal sponsor shall: provide all lands, easements, rights-of-way and dredged material disposal areas; provide relocations of bridges and roadways; provide alteration of utilities which do not pass under or through the project structures; and maintain and operate the project after construction.

Further project planning, engineering and design (PED), and construction of the selected plan would be conducted in accordance with the cost-sharing principles provided by the Corps of Engineers' Planning Guidance, Engineering Regulation (ER) 1105-2-100, reflecting existing laws and Administration policies. During PED, additional necessary project features may be identified and added to this project. In this event, the project cost sharing would be adjusted accordingly in accordance with the terms that will be included in the Project Cooperation Agreement.

Table 27 and Table 28 present the project first costs and the cost apportionment between the Federal and non-Federal sponsor, respectively. The total project cost is currently estimated at $18,200,000 at December 1999 price levels. The Federal share is estimated at $9,185,000 of which $9,100,000 is for flood control and $85,000 for cultural resources requirements. The non-Federal sponsor's total initial cost for LERRDS, PED, and the five percent cash contribution would exceed the fifty maximum allowed (in accordance with WRDA 1986, as amended). It is currently estimated that the Federal government would reimburse the non-Federal sponsor the amount of $685,000 in order to maintain the fifty–fifty cost-sharing basis. The non-Federal sponsor's fifty percent share is currently estimated at $9,100,000. Table 30 shows the detailed project costs and Table 31 shows how the project costs would be allocated between the Federal government and the local sponsor.

For cost sharing purposes the fully inflated costs have been determined and allocated as shown on Table 29. "Fully Inflated Project Costs and Allocation ". The total fully inflated project cost is $19,977,000 of which, $10,156,000 would be Federal share and $9,821,000 would be non-Federal share.

Table 29. Fully Inflated Project Costs and Yearly Allocation

	Year 2001	Year 2002	Year 2003	Year 2004
Federal	$ 429,000	$ 653,000	$ 3,569,000	$ 5,505,000
Non-Federal	$ 231,000	$ 6,470,000	$ 2,513,000	$ 607,000
Total	$ 660,000	$ 7,123,000	$ 6,082,000	$ 6,112,000

C. Current and Future Work Eligible for Credit

There is no current or future work planned or in construction, which is part of the selected plan, or which would be eligible for Section 104 Credit.

Table 30. MCACES – Project Costs for Recommended Plan

LOWER MISSION CREEK PRELIMINARY PROJECT CONSTRUCTION COST ESTIMATE FY 99								
	DESCRIPTION	Qty	Unit	Unit Price	Cost w/o Contingency	Contingency	Cost w/ Contingency	Contingency Factor(1)
01.18-	Lands and Improvements	1	LS	4,566,608.00	4,566,600.00	685,000.00	5,251,600.00	15.0%
02.03-	Relocations Costs (P.L.91-646)	1	LS	169,000.00	169,000.00	25,400.00	194,400.00	15.0%
01.22-	Non-Federal Admin. Costs	1	LS	342,000.00	342,000.00	51,300.00	393,300.00	15.0%
01.21-	Federal Admin. Costs	1	LS	171,000.00	171,000.00	25,700.00	196,700.00	15.0%
09.01-	Clearing & Grubbing	1	LS	45,547.00	45,500.00	9,100.00	54,600.00	20.0%
09.02-	Remove Ex. Slope Protection	1	LS	82,477.00	82,500.00	16,500.00	99,000.00	20.0%
09.02-	Excavation	81,355	CY	3.00	244,100.00	48,800.00	292,900.00	20.0%
09.02-	Backfill	16,429	CY	5.00	82,100.00	16,400.00	98,500.00	20.0%
09.02-	Pile Wall -1560 lf - Concrete - walls	624	CY	240.00	149,800.00	30,000.00	179,800.00	20.0%
09.02-	Pile Wall - Concrete pile wall Steel Reif.	74,880	LBS	0.55	41,200.00	8,200.00	49,400.00	20.0%
09.02-	Pile Wall -1560 lf - Concrete pile cap	520	CY	85.00	44,200.00	8,800.00	53,000.00	20.0%
09.02-	Pile Wall - Concrete pile cap Steel Reinf.	52,000	LBS	0.55	28,600.00	5,700.00	34,300.00	20.0%
09.02-	Piles - 36"dia, 26 depth	195	EA	2,265.00	441,700.00	88,300.00	530,000.00	20.0%
09.02-	Riprap wall-4370lf - Concrete –wall	2,185	CY	240.00	524,400.00	104,900.00	629,300.00	20.0%
09.02-	Riprap wall-4370lf - Concrete –footing	5,891	CY	167.00	983,800.00	196,800.00	1,180,600.00	20.0%
09.02-	Riprap wall-4370lf – Riprap	3,560	Tons	27.00	96,100.00	19,200.00	115,300.00	20.0%
09.02-	Riprap wall - 4370 lf - Steel Reinforcement	969,120	LBS	0.55	533,000.00	106,600.00	639,600.00	20.0%
09.02-	Filter Material	809	CY	67.00	54,200.00	10,800.00	65,000.00	20.0%
09.02-	Top Soil	1,052	CY	33.00	34,700.00	6,900.00	41,600.00	20.0%
09.02-	12" dia. - 4 ft. cut RCP planter	420	EA	40.00	16,800.00	3,400.00	20,200.00	20.0%
09.02-	36" dia. - 4 ft. cut RCP planter	109	EA	113.00	12,300.00	2,500.00	14,800.00	20.0%
09.02-	Box Culvert - Concrete - invert	876	CY	220.00	192,700.00	38,500.00	231,200.00	20.0%
09.02-	Box Culvert - Concrete – walls	475	CY	250.00	118,800.00	23,800.00	142,600.00	20.0%
09.02-	Box Culvert - Concrete – top	568	CY	230.00	130,600.00	26,100.00	156,700.00	20.0%
09.02-	Box Culvert - Steel Reinforcement	365,000	LBS	0.55	200,800.00	40,200.00	241,000.00	20.0%
09.02-	Box Culvert - Piles 2' Dia. – 60'	46	EA	2,265.00	104,200.00	20,800.00	125,000.00	20.0%
09.02-	Inv T Wall - 360 lf - Concrete - walls	200	CY	240.00	48,000.00	9,600.00	57,600.00	20.0%
09.02-	Inv T Wall - 360 lf - Concrete - footing	330	CY	175.00	57,800.00	11,600.00	69,400.00	20.0%
09.02-	Inv T Wall - 360 lf - Steel Reinforcement	63,600	LBS	0.55	35,000.00	7,000.00	42,000.00	20.0%
	Inv Weir - Concrete	156	CY	220.00	34300.00	6900.00	41200.00	20.0%
	Wall Weir – Concrete	22	CY	220.00	4800.00	1000.00	5800.00	20.0%
	Weir - Steel Reinforcement	2,670	LBS	0.55	1500.00	300.00	1800.00	20.0%
	Fish Baffles/Boulder Clusters	907	Tons	60.00	54400.00	10900.00	65300.00	20.0%
	Fish Ledges – Conc.	48	CY	220.00	10600.00	2100.00	12700.00	20.0%
09.02-	Shoring	33,210	SF	30.00	996,300.00	199,300.00	1,195,600.00	20.0%
09.02-	Channel Fencing	6,920	LF	12.00	83,000.00	16,600.00	99,600.00	20.0%
09.99-	Railroad Temp Detour	1	LS	145,000.00	145,000.00	29,000.00	174,000.00	20.0%
09.99-	Aesthetic Treatment - Color Admixture		CY	12.00	36,100.00	7,200.00	43,300.00	20.0%
09.99-	Concrete Liners for Formwork	38800	SF	3	116,400.00	23,300.00	139,700.00	20.0%
09.02-	Bottom Riprap for Bridges	2222	Tons	27	60,000.00	12,000.00	72,000.00	20.0%
09.30-	Planting and Maintenance	1	LS	187,500.00	187,500.00	37,500.00	225,000.00	20.0%
09.05-	Mitigation	1	LS	562,300.00	562,300.00	112,460.00	674,800.00	20.0%
	SUBTOTAL CONSTRUCTION				11,843,700.00	1,025,600.00	13,950,200.00	
30--	PE&D - Note (2) 15.0% of Construction Costs	1	LS		1,240,042.50		1,504,140.00	20.0%
31--	S&A - Note (3) 6.3% of Construction Costs	1	LS		520,817.85		631,738.80	20.0%
SUBTTL CONSTRUCTION with PED & S&A					13,604,560.35		16,086,080.00	
	BRIDGE COSTS - Note (4)							
08.-								
08.07-	Ortega Street Bridge	1	LS	455,000.00	455,000.00	113,800.00	568,800.00	25.0%
08.07-	Cota Street Bridge	1	LS	500,000.00	500,000.00	125,000.00	625,000.00	25.0%
08.07-	De la Vina Street Bridge	1	LS	282,750.00	282,750.00	94,250.00	377,000.00	25.0%
08.07-	Mason Street Bridge	1	LS	384,100.00	384,100.00	96,000.00	480,100.00	25.0%
08.07-	Utility Relocations (water or sewer lines)	5	EA	10,000.00	50,000.00	12,500.00	62,500.00	25.0%
SUBTOTAL BRIDGE CONSTRUCTION					1,671,850.00	429,050.00	2,113,400.00	
TOTAL PROJECT COSTS (Incl. contingency)					15,276,410.35		18,200,000	
09.99-	Annual OMRR&R Costs	1	LS				30,000.00	
09.99-	Cultural Resources Costs	1	LS				85,000.00	

NOTES:

(1) Contingency percentage is based on ER 1110-2-1302 dated 31 March 1994, recommendation of 20% to 25% contingency factor which represents a reasonable percentage for the construction feature of the cost estimate for a feasibility phase project. 15% contingency factor applied for real estate costs as reasonably based on a gross appraisal of the impacted properties.

(2) Fifteen percent (15.0%) of total construction costs for PE&D, including engineering during construction (EDC)

(3) Six and three tenths percent (6.30%) of total construction costs for S&A

(4) Preliminary cost to construct bridges submitted by the Local Sponsor. Since De la Vina Street bridge is scheduled for replacement prior to project implementation, only the cost of increasing the bridge capacity ($377,000) up to the new design flow is included in the economic analysis and construction costs.

Table 31. Cost Apportionment
Lower Mission Creek Flood Control Project

Item	Federal	Non-Federal
a. LERRDS		
1. Lands and Structures to be Acquired	$0	$5,251,600
2. Relocation Costs (P.L. 91-646)	$0	$194,400
3. Administration Costs	$196,700	$393,300
b. Bridges, Railroad Detour, and Utility Relocations	$0	2,113,425
1. Subtotal (LERRDS)	$196,700	$7,952,725
c. Creek Construction	$5,760,900	$0
d. Box Culvert	$896,500	$0
e. Railroad Detour	$0	$174,000
f. Planting and Maintenance	$225,000	$0
g. Mitigation	$674,800	$0
h. Aesthetics	$183,000	$0
2. Subtotal (Creek Improvement Costs)	$7,740,200	$174,000
i. Plng, Engrg, and Design (PE&D) incl. EDC (Notes 2 &3)	$977,700	$526,500
j. Construction Management (S&A) (Notes 2 &4)	$410,600	$221,100
3. Subtotal	$1,388,300	$747,600
k. 5% Sponsor Cash Contribution	$0	$910,000
l. Credit for Sponsor Cash Contribution. See Note (1)	($910,000)	$0
4. Subtotal (1+2+3+k+l) [1]	$8,416,000	$9,785,000
Percent of Total Project First Cost	**46%**	**54%**
m. Bridge and Utility Relocations Adjustment (Federal share to reduce Sponsor share to 50% max.) [1]	$685,000	($685,000)
n. 50% share of total projects first costs[1] (4.+ m.)	$9,100,000	$9,100,000
o. Cultural Mitigation Costs	$85,000	$0
Total Project Share[1]	**$9,185,000**	**$9,100,000**

[1] Rounded to nearest thousand

(1) *The combined Non-Federal share including LERRDS and associated costs, and the required 5% Non-Fed contribution will amount to 54% of the project cost. In order to reduce the Non-Federal Sponsor's share to the maximum allowed (under WRDA 1986, as amended) to 50% of the total project cost, the Federal Gov't would share the cost for bridge and utility relocations in the amount of $910,000.*

(2) *Non-federal costs for items i. and j. account for Sponsor's planning, engineering, design, and construction efforts associated with lands easements, relocations, rights of way, and disposal sites (LERRDS)*

(3) *Plng, Engrg, and Design (PE&D) including engr'g during construction assumed to be 15% of total construction costs*

(4) *Construction Management (S&A) assumed to be 6.3% of total construction costs*

D. *Institutional Requirements*

In order to implement the Selected Plan, the Non-Federal Sponsor, the Santa Barbara County Flood Control and Water Conservation District would be required to:

a. Provide a minimum of 35 percent, but not to exceed 50 percent of total project costs as further specified below:

(1) Enter into an agreement, which provides, prior to execution of the project cooperation agreement (PCA), 25 percent of design costs;

(2) Provide during construction, any additional funds needed to cover the non-federal share of design costs;

(3) Provide, during construction, a cash contribution equal to 5 percent of total project costs;

(4) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

(5) Provide or pay to the Government the cost of providing all retaining dikes, wastewiers, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(6) Provide, during construction, any additional costs as necessary to make its total contribution equal to 35 percent of total project costs.

b. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

c. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating (OMRR&R) the project or completed functional portions of the project, including mitigation features without cost to the Government, in a manner compatible with the project's authorized purpose and in accordance with applicable Federal and State laws and specific directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto.

d. Comply with section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project of separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation of for the project or separable element.

e. Hold and save the Government free from all damages arising for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

f. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

g. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

h. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way

that the Government determines necessary for the construction, operation, or maintenance of the project.

i. Agree that, as between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and, to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

j. Prescribe and enforce regulations to prevent obstruction of or encroachment on the Project that would reduce the level of protection it affords or that would hinder operation or maintenance of the Project.

k. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public law 91-646, as amended by title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

l. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), requiring non-Federal preparation and implementation of flood plain management plans.

m. Provide 35 percent of that portion of total cultural resource preservation mitigation and data recovery costs attributable to structural flood control that are in excess of one percent of the total amount authorized to be appropriated for structural flood control.

n. Participate in and comply with applicable Federal floodplain management and flood insurance programs.

o. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

p. Inform affected interests, at least annually, regarding the limitations of the projection afforded by the project.

E. Environmental Requirements

The Selected Plan would result in discharge of fill material into waters of the United States during the period of construction. It would also in discharges associated with operation and maintenance activities. A waiver for Clean Water Act Section 401 certification has been provided by the State for the maintenance of this project. A Section 404(b)(1) evaluation has been prepared to address practicable alternatives and has been made part of this feasibility study. An NPDES permit will also be required for any water discharged to the river.

Based on 404(b)(1) analysis, the feasibility report recommends that the project receive a 404(r) exemption, when Congress authorizes the project. The 404(r) exemption would cover both the construction period and the operation and maintenance activities, for as long as the project remains authorized.

The report and EIS/EIR both include a description of the required O&M activities, including timing, and any required mitigation that will be needed, for as long as the project remains authorized. These activities will be incorporated into an O&M manual that will be provided to the non-Federal sponsor at the end of construction.

The non-Federal sponsor will not need to obtain a Section 404 permit for future O&M activities if the non-Federal sponsor carries out the O&M activities as specified in the O&M manual, without deviation. Anytime during the life of the project should O&M requirements need to be modified or should there be a change in conditions not anticipated during this feasibility study, then an

appropriate NEPA document will need to be prepared to modify the O&M manual and determine the need for any mitigation or 404 permit for O&M activities.

Several structures within the Area of Potential Effect (APE) have been identified as eligible for inclusion in to the National Register of Historic Places. However, the selected plan as designed would not have adverse effect to any of these eligible historic properties. Consultation with the SHPO towards compliance with Section 106 has been completed with their concurrence that the project as designed will have no adverse effect on eligible historic properties. The project is in compliance with Section 106 of the National Historic Preservation Act.

During the construction phase, the possibility exists that ground disturbing activities may uncover subsurface deposits. A qualified archaeological monitor will be in place during all ground disturbing activities and he/she will be empowered to halt construction until the situation is resolved. Local ordinances require the presence of a Native American monitor that has traceable hereditary roots to the Barbareño Chumash. The National Historic Preservation Act has no such requirements for Native American monitoring.

F. Views of the Non-Federal Sponsor

The Santa Barbara County Flood Control and Water Conservation District with the support of the City of Santa Barbara, has expressed interest in continuing to be local sponsor for project implementation. The SBCFCD&WCD and the City have provided Letters of Support acknowledging sponsorship requirements for the lower Mission Creek Flood Control Project. These letters are provided in Exhibit 9. "Letters of Support and Financial Capability". The local sponsor has indicated interest in adding embellishments to the final project. The local sponsor realizes that any costs associated with embellishments would be 100% local responsibility. Specific embellishments would be identified during PED.

G. Sponsor's Financial Analysis

Subsequent to the Feasibility study, project engineering, design, and construction would be conducted in accordance with the cost-sharing requirements provided by the Water Resources Development Act of 1986, as amended. The non-Federal sponsor has indicated its ability and interest to participate in the planning, engineering, and design of the selected plan, and its eventual construction. The non-Federal sponsor has provided the preliminary financing plan and statement of financial capability. The District finds that the non-Federal sponsor has the capability to fund its portion of the implementation responsibilities. The financing plan and statement of financial capability is provided in Exhibit 9. "Letters of Support and Financial Capability".

H. Procedures for Implementation

Future actions necessary for authorization and construction of the selected plan are summarized as follows:

(1) This report will be reviewed by the Headquarters of the U.S. Army Corps of Engineers, Washington D.C.

(2) The Chief of Engineers will seek formal review and comment by the Governor of the State of California and interested Federal agencies.

(3) Following State and Agency review, the report will be sent to the Assistant Secretary of the Army for Civil Works.

(4) Upon approval of the Assistant Secretary, the report will be for-warded to the Office of Management and Budget (OMB) to obtain the relationship of the project to programs of the President.

(5) The final report of the Chief of Engineers will then be forwarded by the Assistant Secretary of the Army for Civil Works to Congress.

(6) Congressional review of the feasibility report and possible authorization of the project would follow.

(7) Pending project authorization for construction, the Chief of Engineers could include funds where appropriate, in his budget requests for preconstruction engineering and design of the project. The objective is to ready the project for a construction start established with the feasibility study.

(8) Following receipt of funds, preconstruction engineering and design would be initiated and surveys and detailed engineering designs would be accomplished.

(9) Following Congressional authorization of the project, plans and specifications would be accomplished by the District Engineer.

(10) Subsequent to appropriation of construction funds by Congress, but prior to construction, formal assurances of local cooperation would be required from non Federal interests.

(11) Bids for construction would be initiated and contracts awarded.

I. Summary of Coordination, Public Views, and Comments

Coordination for this project essentially began in 1963 when the Corps built two debris basins on Mission and Rattlesnake Creeks following the Coyote Fire. In 1970, Congress authorized a project that would concrete-line 12 miles of Mission Creek and build a diversion channel into Arroyo Burro Creek, however due to expected significant loss of biological and aesthetic resources, the project was rejected by the community. Subsequent coordination between the Corps and City of Santa Barbara Environmental Quality Advisory Board were unsuccessful in developing a locally acceptable flood control solution on Mission Creek.

Following the floods of 1978 and 1980, the City and County requested another study of the flooding problem. In 1983, the Corps worked with the Citizen's Advisory Committee established by the City Council to select a project that meets both the flood control and community needs. They met 13 times over the period of three years and in 1986 proposed a project that would fully concrete-lined and provide 100-year flood control protection, however in response to community concerns, no debris basins were included in the design. Upon endorsement by the City Council, Planning Commission and the County Board of Supervisors, the Corps initiated the feasibility study. In 1988, Congress authorized the fully concrete-lined channel project. The City Council formed a Mission Creek Alternatives Task Force to look at other alternatives to the project, based on public concerns regarding the endorsed project. Due to technical problems discovered during design phase, the project was abandoned in 1993. Afterwards, the City Council and the Board of Supervisors established the Mission Creek Consensus Group to develop an alternative that is acceptable to the community as a whole. The Consensus Group includes Board of Supervisors and Council members, environmental community and business/property owners. A series of Consensus Group meetings were held to determine criteria for an acceptable flood control project and selection of alternatives for further study.

At the request of the Board of Supervisors and the City Council, the Corps initiated a Reconnaissance Study in 1994 on the feasibility of the selected alternatives proposed by the Consensus Group and other alternatives not previously studied by the Corps. Two public meetings were held to gather community inputs for Reconnaissance Study and in November 1995, the reconnaissance study recommended further feasibility studies of the alternatives developed.

In July 1997, the Corps initiated this Feasibility Study and held a public workshop in August 1997. An environmental scooping meeting was held in October 1998 to gather input on environmental impacts to be considered in the EIS/EIR. The City and the County held numerous public meetings during the course of the study to present project details and gather community inputs. In December 1999, the Draft Feasibility Report and the EIS/EIR was released for public review and a Public Hearing was held in January 2000. Based on comments from resource agencies and the public, appropriate changes were made and incorporated in Recommended Plan.

Coordination and consultation with various agencies and interested parties were held throughout the study process. Agencies include the U.S. Fish & Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), U.S. Army Corps of Engineers Regulatory Branch, California Regional Water Quality Control Board (CRWQCB), California Department of Fish and Game (CDFG), California Coastal Commission, and State Historic Preservation Officer (SHPO). Interested parties include the Environmental Defense Council, Urban Creeks Council, and Audubon Society. The correspondence with the agencies is located in Appendix J of the EIS/EIR. A summary of coordination is provided in the following section.

U.S. Fish & Wildlife Service (USFWS):

Informal discussions with USFWS began late in the fall of 1997. Conversations ranged widely over suitability of habitat along Lower Mission Creek for amphibians, benthic invertebrates, riparian species which form both major structural layers in the riparian plant community, historic occurrences of steelhead in Mission Creek, and the nature of spawning areas and feeding areas

used by tidewater gobies. More involved coordination included participation by USFWS at the F4 conference held in April 1999 and the Alternative Formulation Briefing (AFB) in August 1999, including three site visits in the spring of 1999. During one of the field excursions, biologists from USFWS and the USACOE studied examples of eroded stream banks stabilized by riprap and planted in native vegetation. The other two trips involved surveying the entire route of Mission Creek for biological species by walking in it from Canon Perdido Street to Cabrillo Boulevard. Biologists from both agencies, USFWS and NMFS, studied the proposed location and design of structural features to mitigate for impacts to tidewater gobies, water velocity profiles, and the lack of sediment deposition in the estuary. That meeting occurred on site and was intended to refine the placement and design of features, which will improve goby habitat in the estuary.

The USACOE has performed a modified Habitat Evaluation Procedure (HEP) to evaluate project related loss of habitat. Calculations in that HEP indicate that specific design features which the Preferred Alternative embodies will yield greater habitat quality compared with future projections if no flood control project were implemented, including the need for annual future maintenance for the life of the project. Conclusions of that HEP have been discussed at length with the USFWS.

The Draft EIS/EIR was provided to the USFWS for their review during the public review period. A comment letter received from the Department of Interior is located in Appendix K. The USACOE coordinated the modification of the proposed project design, and related changes with the USFWS. On June 7, 2000, the USFWS participated in a meeting with the NMFS via telephone to discuss project design and mitigation features to minimize impacts to the steelhead and tidewater gobies. Subsequent to that meeting, on June 21, 2000, the USACOE provided a revised biological assessment, mitigation monitoring plan, revised project description, hydraulic/engineering analysis, biological assessment for steelhead and project plan. After receipt of the revised biological assessment and supporting information, the USFWS stated that to determine the project related impacts to tidewater gobies, they need additional project specific information.

National Marine Fisheries Service (NMFS):

Starting in January 1998, the USACOE began informal discussions with NMFS regarding many aspects of the life history of steelhead in southern California. These discussions have included, but not been limited to, the fidelity of individuals (and hence their genes) to the stream in which they were spawned, the history of stocking coastal streams with fish derived from hatchery stock, the genetic ambiguity of fish as judged by their phenotypic appearance at different stages of their life cycle, the mal-adaption of hatchery trout to survive ocean conditions, and the stimuli which prompt adult steelhead to swim up streams and young steelhead (also known as smolts) to swim down. NMFS regards Mission Creek as a potentially significant migratory corridor for steelhead, despite the general effects of urban development in Santa Barbara. NMFS participated in the F4 conference held in April 1999. A biologist from NMFS participated in one of the field excursions along Mission Creek in May 1999.

Informal discussions with NMFS have dwelt on the physical arrangement of the oxbow bypass culvert and the properties of water flowing through it. This design element of some flood control alternatives should not affect migrating steelhead, either adults or smolts. Water velocities and depths within this structure were a central matter in Section 7 Consultations between NMFS and USACOE.

A biological assessment was provided to the NMFS with the Draft EIS/EIR in December 1999. The project design was modified after release of the Draft EIS/EIR due to hydraulic/engineering and real estate constraints. The culvert length was increased from the original design. Therefore, the NMFS raised some concerns to determine project related impacts to steelhead. Extensive coordination occurred with their staff to provide satisfactory information. By letter dated March 21, 2000, the NMFS requested of information to analyze project related impacts to steelhead (see Appendix J). They requested detailed project design, cross sections and longitudinal profiles of stream channel throughout the project area, detailed hydraulic analysis, velocity and depths of water within the low flow channel and culvert, scheduling/timing of construction, maintenance procedures, and a detailed monitoring plan.

Since the receipt of the request from the NMFS, the USACOE performed numerous hydraulic/engineering analyses to design the weir to maintain the desired water flow through the oxbow to avoid impacts to migration of steelhead through the constructed channel. The USACOE developed additional structural mitigation features to minimize impacts to steelhead and tidewater gobies. On June 7, 2000, the USACOE staff met with NMFS staff at their office. Mr. Jon Mann (hydrologist) participated in a video conference call and the City staff and USFWS participated via telephone in this meeting. The USACOE provided a brief summary of the modified project design, water velocity within the channel, length, height and location of weir, how a weir would guarantee a minimum flow of 640 cfs through the existing oxbow channel, and implementation of other mitigation features to minimize impacts to steelhead and gobies. Both agencies worked together to achieve a common goal to minimize impacts to steelhead. The USACOE incorporated their recommendations to a maximum extent possible in the project design.

At this meeting, the NMFS stated that minimal daily flow, sediment budget, existing water surface profiles, longitudinal profiles of the creek bed and representative cross-sections of the stream need to be considered in project design. Agreement was reached that a 2.3 year level of flow, equal to about 640 cfs, should pass through the low flow channel. Mitigation features to ensure this flow level and other structural features to be implemented to minimize impacts to steelhead were discussed. The NMFS agreed with the proposed mitigation structural features to minimize impacts to steelhead (see details in biological assessment of steelhead). The USACOE agreed to provide all required detailed hydraulic/engineering analysis, design plan, revised biological assessment, and revised project description by the middle of July 2000. On July 16, 2000, the USACOE provided a revised biological assessment with the supporting information, including revised project description, hydraulic/engineering analysis, mitigation monitoring plan, shade study, revised biological assessment for steelhead, and project plan. The NMFS provided a Final Biological Opinion on August 2, 2000 (see Appendix B).

U.S. Army Corps of Engineers Regulatory Branch:

The Environmental Resources Branch (ERB) initiated coordination with the USACOE Regulatory Branch in March 1999. The Regulatory staff participated in the F-4 conference meeting. A copy of the F-4 package was provided to Regulatory Branch (Ventura Field Office) for their review. Regulatory staff participated in both meetings, the F4 conference and the AFB.

The Regulatory branch received an application from the local sponsor to obtain a Section 404 USACOE Regulatory permit (December 20, 1999, Appendix E-1). Regulatory Branch requested a detailed mitigation monitoring plan identifying goals, success criteria and monitoring of the planted vegetation and other biological resources. The Environmental Resources Branch (ERB) prepared a detailed mitigation monitoring plan and on June 22, 2000, revised information including: revised project description, mitigation monitoring plan, revised biological assessments and hydraulic/engineering analysis and project plans and drawings were provided for their information. The ERB staff will coordinate with the Regulatory Branch of waiver of the Section 404 Water Quality permit under Section 404 (r) regulation.

California Regional Water Quality Control Board (CRWQCB):

On August 17, 1999, the USACOE called CRWQCB staff to inform them the proposed Lower Mission Creek Flood Control Project. Mr. Higgins stated that their concerns would be the restoration of riparian vegetation in the stream, which provides benefits to water quality and improves the environment for steelhead. The CRWQCB would tend to defer to USFWS and NMFS on these issues. The CRWQCB's major goal is improvement of the environmental conditions along Lower Mission Creek. The USACOE invited the CRWQCB to participate in the AFB meeting. Mr. Higgins could not attend the meeting.

On November 9, 1999, the USACOE staff informed CRWQCB that the proposed project construction would be exempted under Section 404(r) regulations. The guideline of 404 (r) has been provided to the CRWQCB staff via e-mail for their information.

On December 20, 1999, the USACOE and the Santa Barbara County Flood Control District submitted a request for a waiver from the Section 401 Water Quality Certification (Appendix E-1) for the proposed project. Future maintenance is a part of the project. Impacts related to future maintenance for the life of the project are included in the EIS/EIR. By letter dated February 2, 2000, the CRWQCB provided a waiver from the Section 401 Water Quality Certification for the project construction and the future maintenance (Appendix E-1). On June 21, 2000, the USACOE provided a revised project description, hydraulics/engineering analysis, biological assessments, and mitigation monitoring plan to CRWQCB for their information. The revised project description did not change impacts to waters of the United States. Therefore, waiver of the Section 401 Water Quality Certification remains in effect.

California Department of Fish and Game (CDFG):

Many informal discussions with CDFG regarding steelhead in Lower Mission Creek have occurred since December 1997. These exchanges centered on details of physiology, historic distribution, fidelity to natal streams, frequency of recognizable genetic stocks of steelhead in southern California streams, and the appearance above the project area of trout with every feature of steelhead after the El Niño rains of 1998. Streambed conditions, which favor migration up and down coastal streams, have been a significant element of discussions and considerations, as well. Following discovery of a pair of steelhead spawning within the project area and numerous malts at Oak Park and other lower sections of the creek in the spring of 2000, further discussions about stream heterogeneity took place. These focus on the benefits of a pilot channel, fish ledges, and side baffles as ways to improve conditions during steelhead migration.

California Coastal Commission:

On November 18, 1999, the USACOE initiated coordination with the California Coastal Commission (CCC) staff (Mr. Jim Raives) of the proposed project. Mr. Jim Raives stated that the proposed project would require a Coastal Consistency Determination (CCD). Informally, the CCD was provided to the CCC for their review and recommendations during preparation of the Draft EIS/EIR.

On December 20, 1999, the USACOE submitted a CCD with project description, HEP analysis report, biological assessments, and Draft Coordination Act Report to CCC. Since submittal of the CCD, extensive coordination has occurred between USACOE, City of Santa Barbara and CCC staff. The CCC staff expressed their concerns for the project design, and required detailed project plans to examine the project features. In addition, they were concerned about construction of vertical walls within the coastal zone, impacts to water quality, non-point source discharge degrading water quality of the creek, goals, success criteria for the planted vegetation, impacts to endangered species, estuarine habitat, mitigation, sand supply, HEP analysis, visual resources and cultural resources. The CCC also desired to have biological opinions from both agencies, USFWS and NMFS, to make their determination. The CCC recommended that the USACOE examine an alternative with vegetated riprap slope or a full vegetated riprap bank below the freeway. The USACOE performed a cursory economic analysis of these alternatives. Results of this conceptual analysis can be found in the Economic Appendix. These alternatives are not economically feasible.

A staff report for the proposed project was prepared in January 2000, and a Draft copy was provided to the USACOE for review. Since then the staff report was revised in July 2000. The USACOE provided response or input formally or informally since January 2000. On June 21, 2000, the USACOE provided revised project description, mitigation monitoring plan, revised biological assessments (steelhead and goby), hydraulics/engineering analysis, and supporting project plans and drawing. The CCC staff again felt that there was not enough information to make their determination and recommendation for the proposed project implementation. The USACOE requested postponement of the public hearing on the proposed project until the biological opinion is received from the USFWS. The CCC staff provided recommendations to incorporate in the project design to minimize impacts to environmental resources. The USACOE will revise the CCD and submit it again to the CCC for their consideration with the biological opinion.

The City of Santa Barbara provided a letter (February 22, 2000, Appendix J) to respond to some of concerns on construction of vertical walls between Yanonali and State Streets, and aesthetics of the coastal zone. The City identified the possibility of using Redevelopment Agency Funds to

improve esthetic resources of the coastal zone within the project area.

State Historic Preservation Officer (SHPO):

Consultation with the SHPO toward Section 106 compliance was completed with receipt of their letter dated August 3, 2000. They concurred with our determinations of eligibility and non-eligibility for the various buildings and structures in the APE. Some structures and both neighborhoods were determined not to be eligible for inclusion on the National Register of Historic Places. They also concurred with our determination that the project as planned will have no adverse effect on properties that are eligible for inclusion or, are included in the National Register of Historic Places. The project complies with Section 106.

Environmental Defense Center:

On July 31, 2000, the USACOE and the City of Santa Barbara met with Mr. Brian Trautwein of the Environmental Defense Center (EDC), Mr. Eddie Harris of the Urban Creeks Council and Ms. Kendy Radasky of the Santa Barbara Audubon Society to discuss their concerns and modifications of the mitigation measures. The concerns discussed at this meeting included, were not limited to, use of vertical walls, loss of streambed habitat, creating a pilot channel (bank-full channel), cleanup of contaminated sites along the creek bank, removal avoidance of vegetation in bank-full channel, planting riparian vegetation should be closer than identified in the EIS/EIR, use of black cottonwood instead of Fremont cottonwood, and fish passage improvements in the Caltrans channel. The USACOE and the City provided a brief summary of the revised mitigation measures, how impacts would be minimized to the listed species and aquatic habitat. The Revised Biological Assessments, Mitigation Monitoring Plan, Revised Project Description and Hydraulic/Engineering Analysis were provided to EDC staff for their information.

Summary of Public Comments

Public comments were solicited throughout the study process through public workshops, meetings, and public review of the Draft Feasibility Report and Draft EIS/R. The bulk of the

public comments and concerns were received during the public review of the Draft Feasibility Report and Draft EIS/EIR between December 1999 and February 2000. The following list summarizes the public comments and concerns:

- impacts to existing structures and lands adjoining the creek;
- limited level of flood protection (20-yr protection);
- consider sedimentation issues during project design;
- loss of setback or buffer zone between creek and development;
- impacts to Endangered Species; steelhead and tidewater gobies;
- impacts to water quality and temperature;
- impacts to culturally significant structures;
- temporal loss of existing creek bank and creek bed vegetation;
- potential loss of mature "skyline" trees;
- potential impact to the Moreton Bay Fig tree;
- potential impacts of future maintenance activities;
- loss of natural bank protection
- loss of aesthetic values due to the presence of concrete walls, wider creek bottom, loss of several mature trees, and project elements not blending with local character;
- providing safety measures from accidentally falling into the creek;
- increased trash and debris collecting in the creekbed;
- impacts from construction activities including traffic congestion, noise, dust;
- etc…

The complete compilation of public comments and concerns, as well as the corresponding responses can be found in Appendix K - "Public Comments and Responses" of the EIS/R.

VII. CONCLUSION

Implementation of a plan to provide flood control along Lower Mission Creek presents an opportunity to decrease flooding frequency while affording much needed environmental benefits. Removal of "patchwork" flood control measures along the creek will aid in restoring the riparian habitat and provide increased conveyance. This Feasibility Study has identified that Alternative 12 as the most economical means of increasing flood protection. Plantings on the sideslopes and within the expanded habitat areas will provide much needed riparian habitat and help restore the major components of the riparian corridor along the creek.

Alternative 12 would provide an approximately 20-year level of flood protection. The average annual benefits associated with the NED amount to $1,592,000. The project would have an annual life cycle costs of $1,367,000. The project would produce $225,000 in net NED benefits annually and would have a B/C ratio of 1.2.

VIII. RECOMMENDATION

I recommend that Alternative 12 as described herein be authorized for implementation as a Federal project. This plan achieves all of the study objectives including flood protection for the residents and businesses of Santa Barbara and restoration of the major elements of a natural riparian corridor along Lower Mission Creek. The total first cost of the project is currently estimated at $18,300,000 under 1999 price level. The Federal share is estimated at $9,200,000 of which $9,100,000 is for flood control and $85,000 for cultural resources requirements.

The non-Federal sponsor's total initial cost for LERRDS, PED, and the five percent cash contribution would exceed the fifty percent maximum allowed (in accordance with WRDA 1986, as amended). It is currently estimated that the Federal government would reimburse the non-Federal sponsor the amount of $685,000 in order to maintain the fifty–fifty cost-sharing basis. The non-Federal sponsor's fifty percent share is currently estimated at $9,100,000.

As a result of the feasibility study recommendations for a new authorization of the selected plan, I recommend de-authorization of the plan previously authorized under the Water Resources Development Act of 1988.

I recommend that the plan recommended herein be exempt from regulations of the Clean Water Act pursuant to Section 404(r) of the Act. The 404(r) exemption will cover the construction period and the operation and maintenance activities for as long as the project remains authorized.

My recommendation is subject to cost sharing, financing, and other applicable requirements of Federal and State laws and policies, including Public Law 99-663, the Water Resources Development Act of 1986, as amended by Section 202 of Public Law 104-303, the Water Resources Development Act of 1996, and in accordance with the following requirements, which the non-Federal sponsor must agree to prior to project implementation.

a. Provide a minimum of 35 percent, but not to exceed 50 percent of total project costs as further specified below:

(1) Enter into an agreement, which provides, prior to execution of the project cooperation agreement (PCA), 25 percent of design costs;

(2) Provide during construction, any additional funds needed to cover the non-federal share of design costs;

(3) Provide, during construction, a cash contribution equal to 5 percent of total project costs;

(4) Provide all lands, easements, and rights-of-way, including suitable borrow and dredged or excavated material disposal areas, and perform or assure the performance of all relocations determined by the Government to be necessary for the construction, operation, and maintenance of the project;

(5) Provide or pay to the Government the cost of providing all retaining dikes, wastewiers, bulkheads, and embankments, including all monitoring features and stilling basins, that may be required at any dredged or excavated material disposal areas required for the construction, operation, and maintenance of the project; and

(6) Provide, during construction, any additional costs as necessary to make its total contribution equal to 35 percent of total project costs.

b. Give the Government a right to enter, at reasonable times and in a reasonable manner, upon land which the local sponsor owns or controls for access to the project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, maintaining, repairing, replacing, or rehabilitating the project.

c. Assume responsibility for operating, maintaining, replacing, repairing, and rehabilitating (OMRR&R) the project or completed functional portions of the project, including mitigation features without cost to the Government, in a manner compatible with the project's authorized purpose and in accordance with applicable Federal and State laws and specific

directions prescribed by the Government in the OMRR&R manual and any subsequent amendments thereto.

d. Comply with section 221 of Public Law 91-611, Flood Control Act of 1970, as amended, and Section 103 of the Water Resources Development Act of 1986, Public Law 99-662, as amended, which provides that the Secretary of the Army shall not commence the construction of any water resources project of separable element thereof, until the non-Federal sponsor has entered into a written agreement to furnish its required cooperation of for the project or separable element.

e. Hold and save the Government free from all damages arising for the construction, operation, maintenance, repair, replacement, and rehabilitation of the project and any project-related betterments, except for damages due to the fault or negligence of the Government or the Government's contractors.

f. Keep and maintain books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to the project to the extent and in such detail as will properly reflect total project costs.

g. Perform, or cause to be performed, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 USC 9601-9675, that may exist in, on, or under lands, easements or rights-of-way necessary for the construction, operation, and maintenance of the project; except that the non-Federal sponsor shall not perform such investigations on lands, easements, or rights-of-way that the Government determines to be subject to the navigation servitude without prior specific written direction by the Government.

h. Assume complete financial responsibility for all necessary cleanup and response costs of any CERCLA regulated materials located in, on, or under lands, easements, or rights-of-way that the Government determines necessary for the construction, operation, or maintenance of the project.

i. Agree that, as between the Federal Government and the non-Federal sponsor, the non-Federal sponsor shall be considered the operator of the project for the purpose of CERCLA liability, and, to the maximum extent practicable, operate, maintain, repair, replace, and rehabilitate the project in a manner that will not cause liability to arise under CERCLA.

j. Prescribe and enforce regulations to prevent obstruction of or encroachment on the Project that would reduce the level of protection it affords or that would hinder operation or maintenance of the Project.

k. Comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public law 91-646, as amended by title IV of the Surface Transportation and Uniform Relocation Assistance Act of 1987 (Public Law 100-17), and the Uniform Regulations contained in 49 CFR part 24, in acquiring lands, easements, and rights-of-way, and performing relocations for construction, operation, and maintenance of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said act.

l. Comply with all applicable Federal and State laws and regulations, including Section 601 of the Civil Rights Act of 1964, Public Law 88-352, and Department of Defense Directive 5500.11 issued pursuant thereto, as well as Army Regulation 600-7, entitled "Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army," and Section 402 of the Water Resources Development Act of 1986, as amended (33 U.S.C. 701b-12), requiring non-Federal preparation and implementation of flood plain management plans.

m. Provide 35 percent of that portion of total cultural resource preservation mitigation and data recovery costs attributable to structural flood control that are in excess of one percent of the total amount authorized to be appropriated for structural flood control.

n. Participate in and comply with applicable Federal floodplain management and flood insurance programs.

o. Do not use Federal funds to meet the non-Federal sponsor's share of total project costs unless the Federal granting agency verifies in writing that the expenditure of such funds is authorized.

p. Inform affected interests, at least annually, regarding the limitations of the projection afforded by the project.

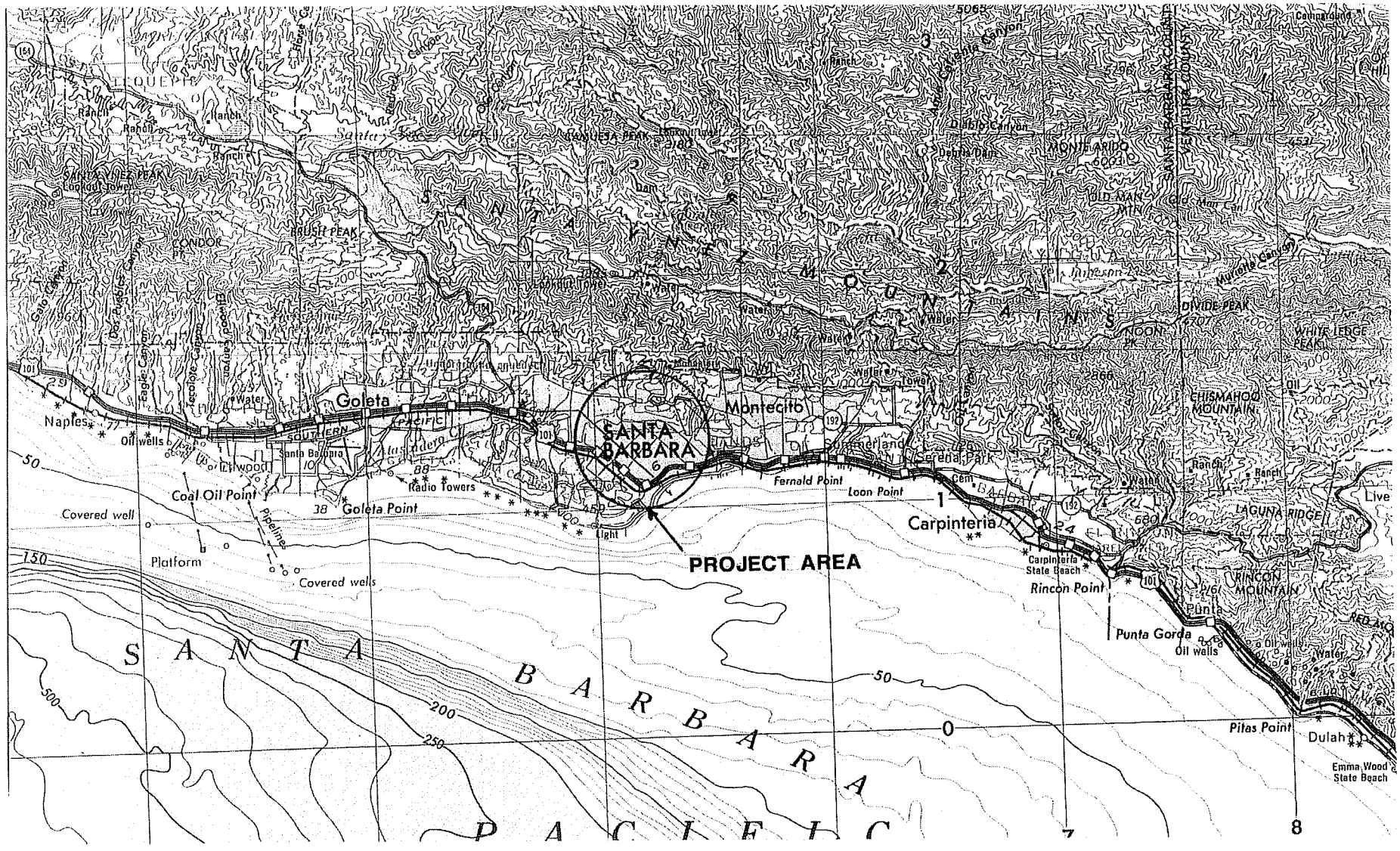
The plan presented herein is recommended with such modifications thereof as in the discretion of the Commander, HQUSACE, may be advisable.

The recommendations contained herein reflect the information available at this time and current Departmental policies governing formulation of individual projects. They do not reflect program and budgeting priorities in the formulation of a national Civil Works construction program nor the perspective of higher review levels within the Executive Branch. Consequently, the recommendations may be modified before they are transmitted to the Congress as proposal for authorization and implementation funding. However, prior to transmittal to the Congress, the non-Federal sponsor, the State, interested Federal Agencies, and other parties will be advised of any modifications and will be afforded an opportunity to comment further.

John P. Carroll
Colonel, Corps of Engineers
District Engineer

EXHIBITS

Exhibit 1. Regional Map
Exhibit 2. Location Map
Exhibit 3. Mission Creek Watershed Map
Exhibit 4. Laguna Channel Drainage Map
Exhibit 5. Mission Creek Floodplain Map
Exhibit 6. Mission Creek Floodplain Map 3400 cfs Project
Exhibit 7. Engineering Plans
Exhibit 8. Architectural Drawings
Exhibit 9. Letter of Support and Financial Capability



Source: USGS 1:250,000, Los Angeles, California

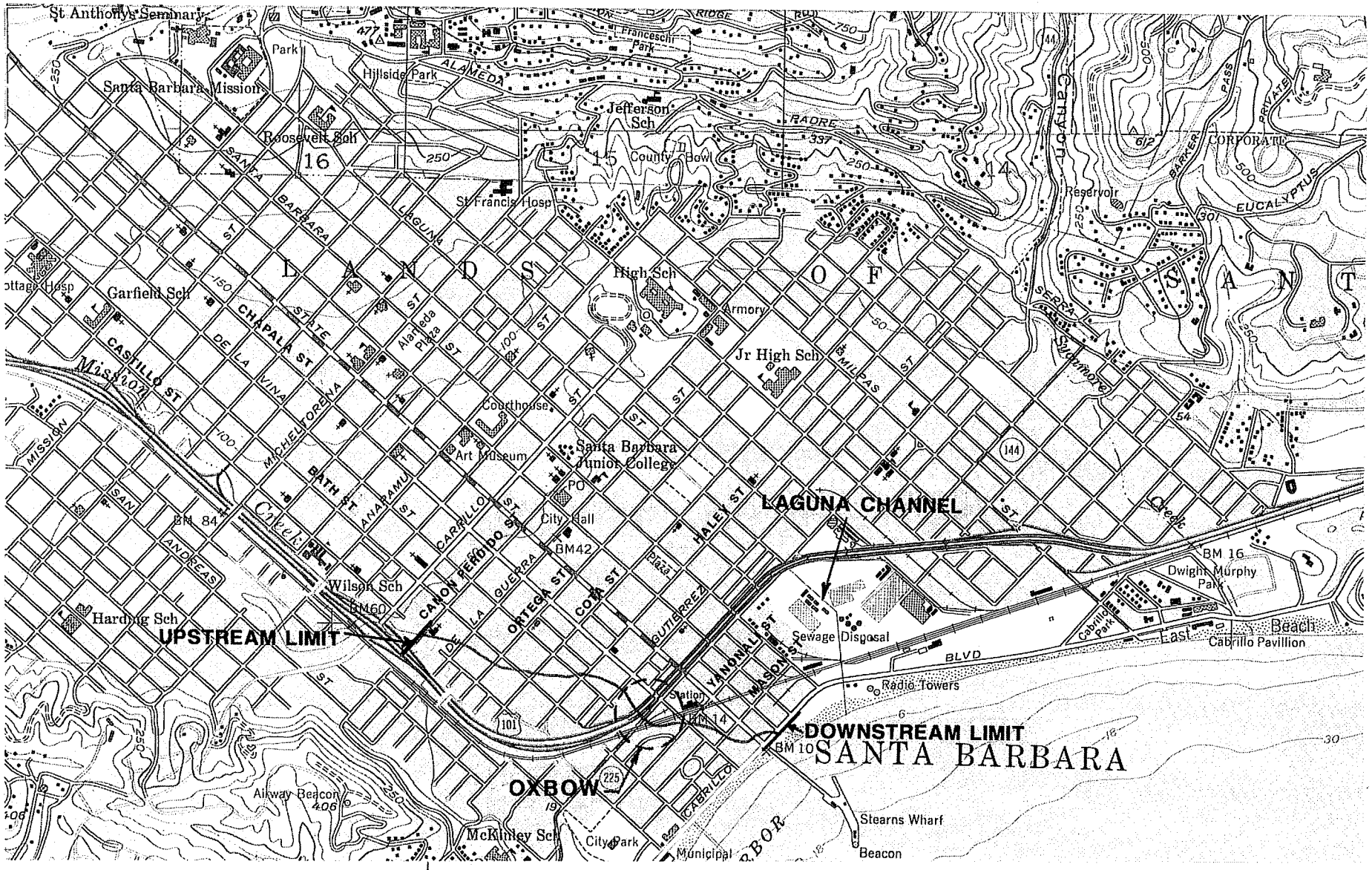
0" 250,000" 500,000"

GRAPHIC SCALE: 1" = 250,000"

SANTA BARBARA COUNTY STREAMS
LOWER MISSION CREEK

REGIONAL MAP

Exhibit 1



Source: USGS 1:24,000, Santa Barbara, California

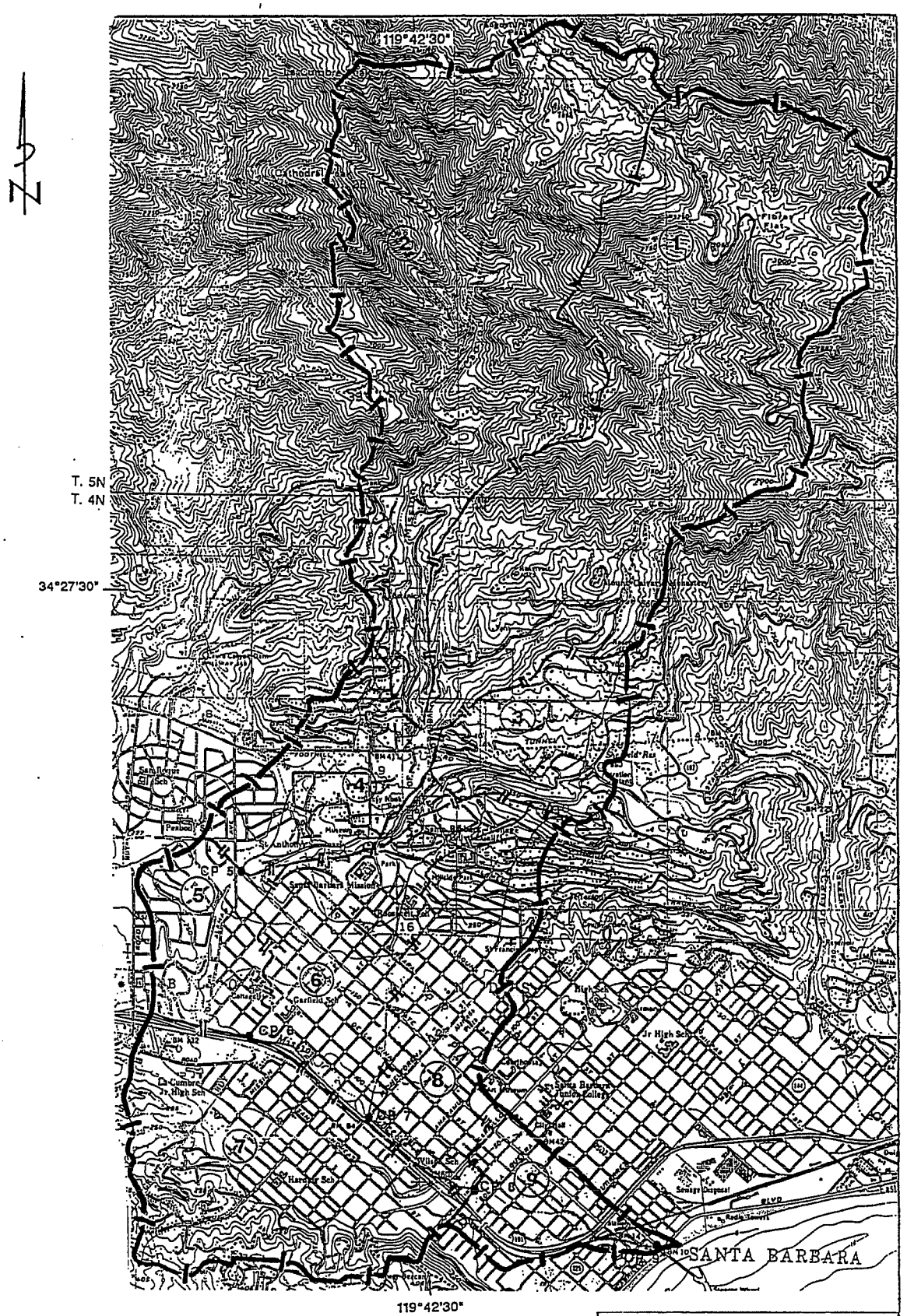
0′ 2000′ 4000′

GRAPHIC SCALE: 1″=2000′

SANTA BARBARA COUNTY STREAMS
LOWER MISSION CREEK

LOCATION MAP

Exhibit 2



LEGEND

— | — Boundary of Drainage Area

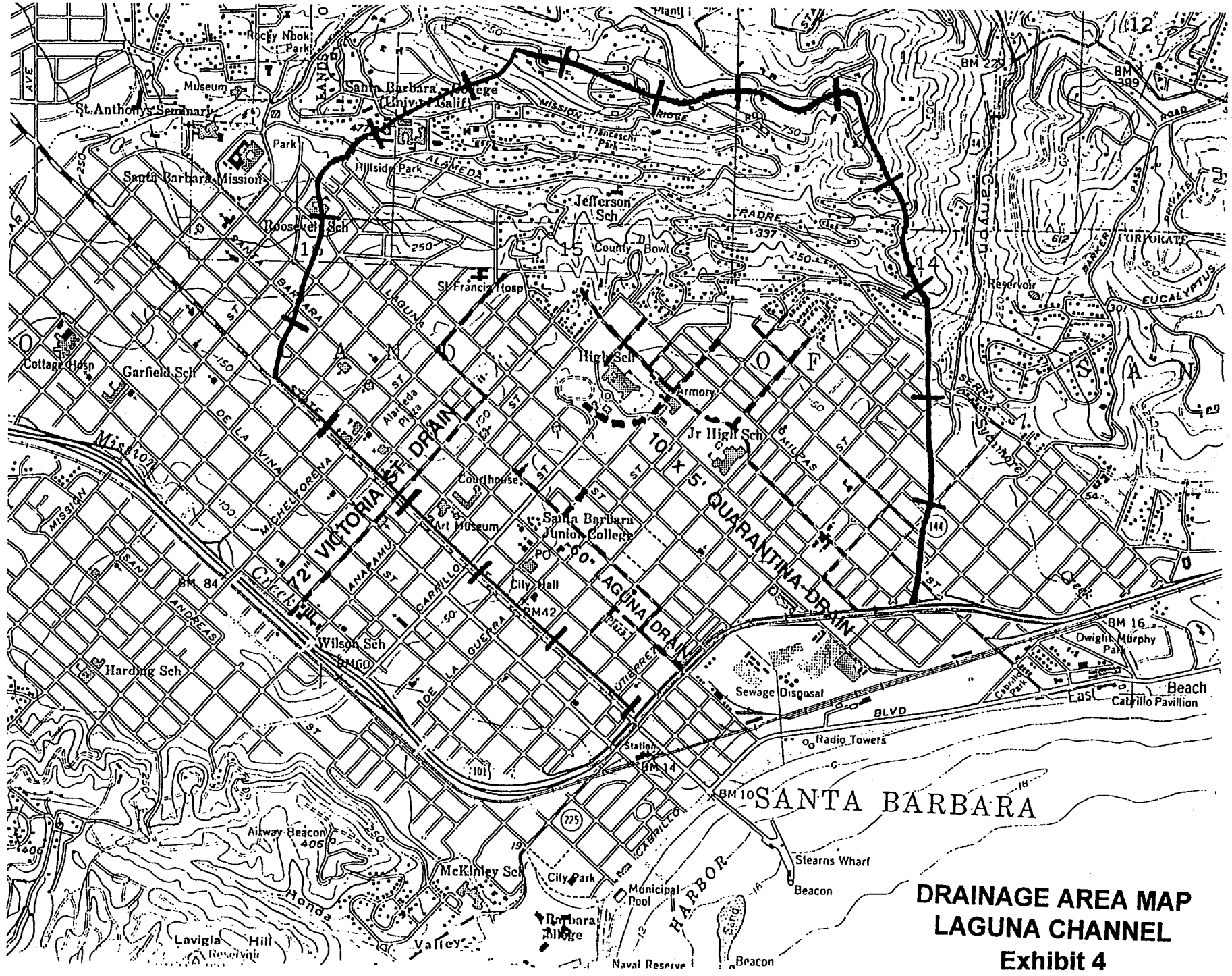
—|| — Boundary of Subarea

(7) Subarea Designation

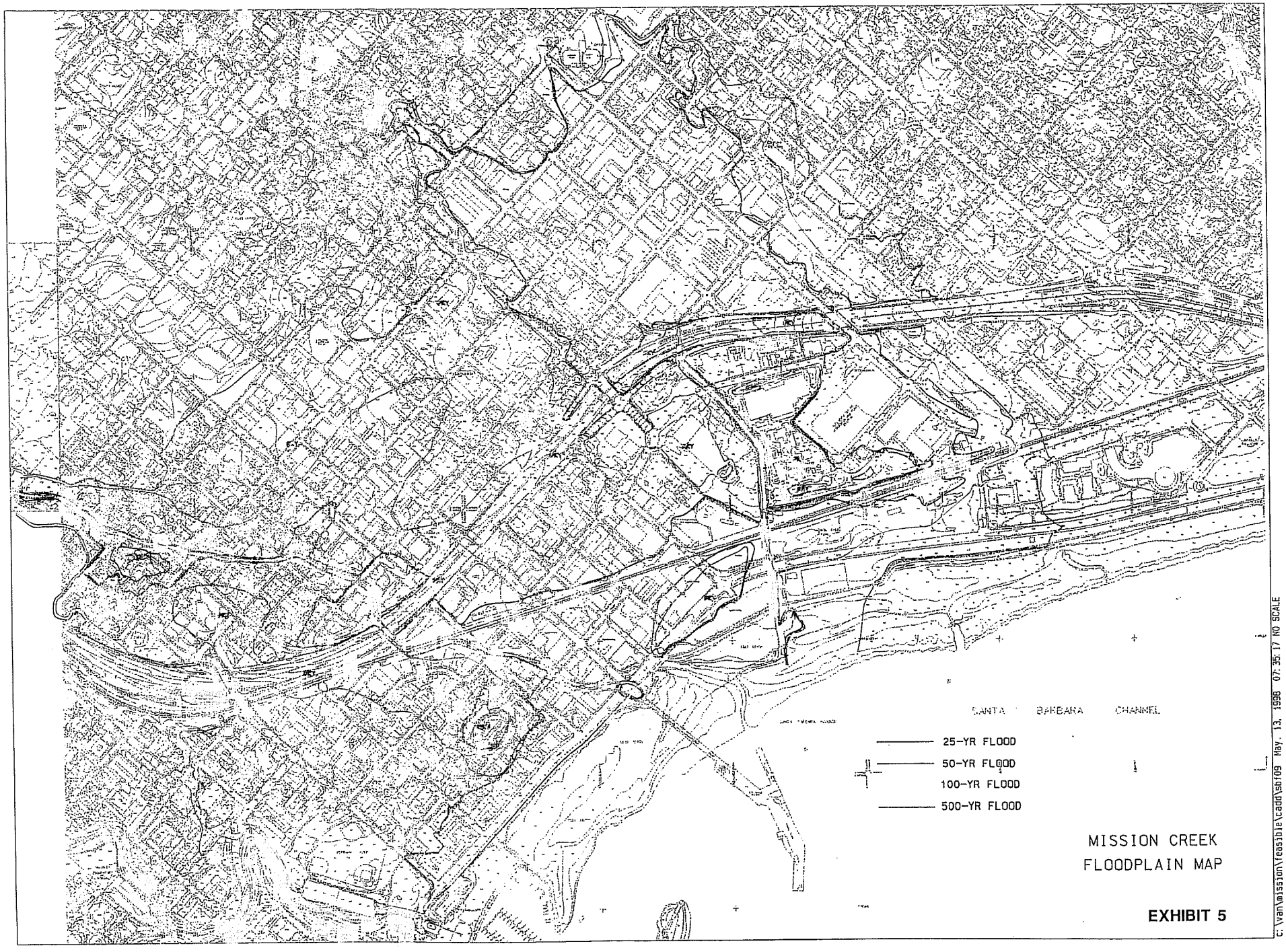
● Concentration Point

SANTA BARBARA COUNTY STREAMS MISSION CREEK
DRAINAGE AREA MAP SHOWING CONCENTRATION POINTS
U. S. ARMY CORPS OF ENGINEERS LOS ANGELES DISTRICT

Exhibit 3



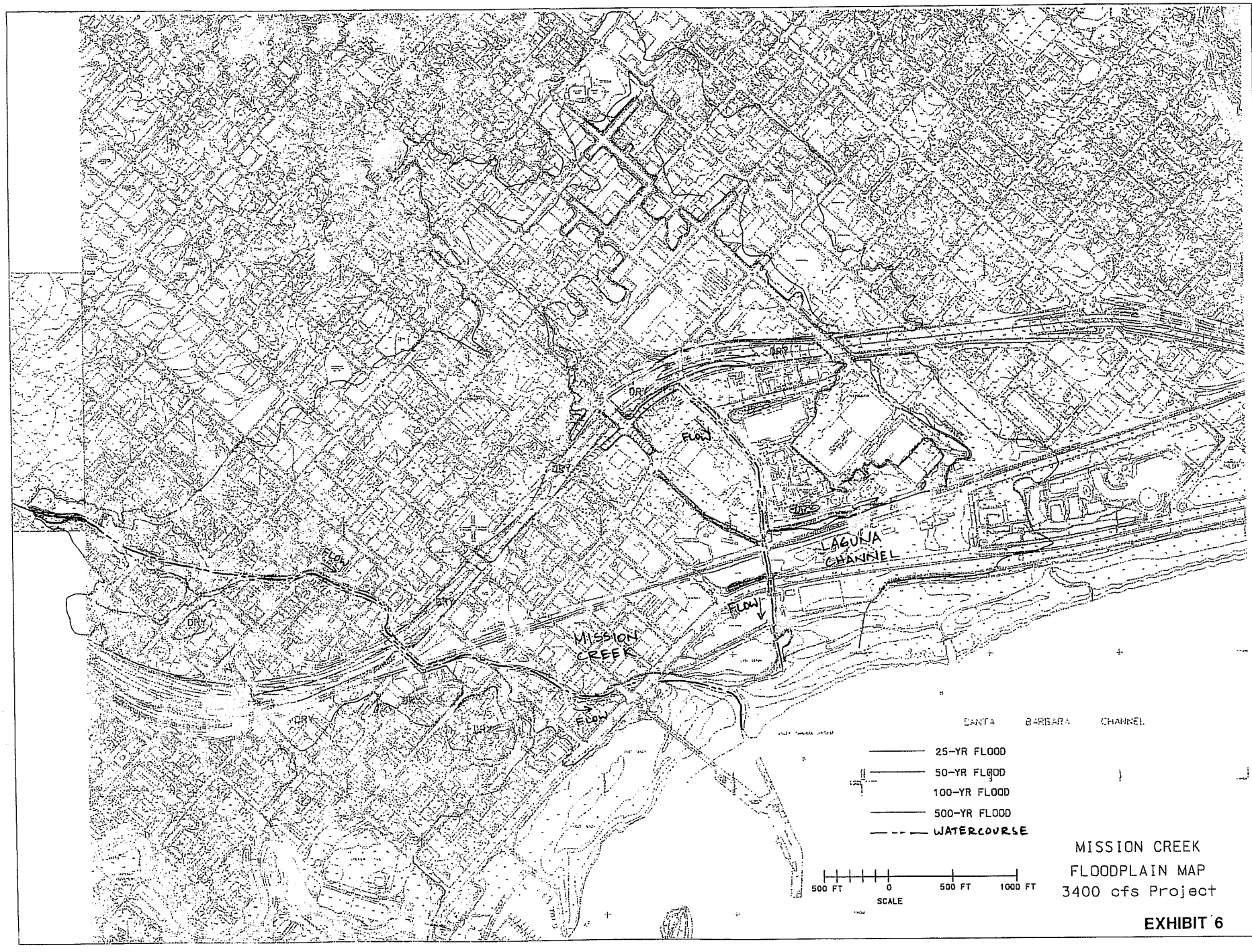
DRAINAGE AREA MAP
LAGUNA CHANNEL
Exhibit 4



MISSION CREEK
FLOODPLAIN MAP

EXHIBIT 5

c:\van\mission\feasible\cadd\sbf09 May. 13, 1998 07:35:17 NO SCALE



MISSION CREEK
FLOODPLAIN MAP
3400 cfs Project

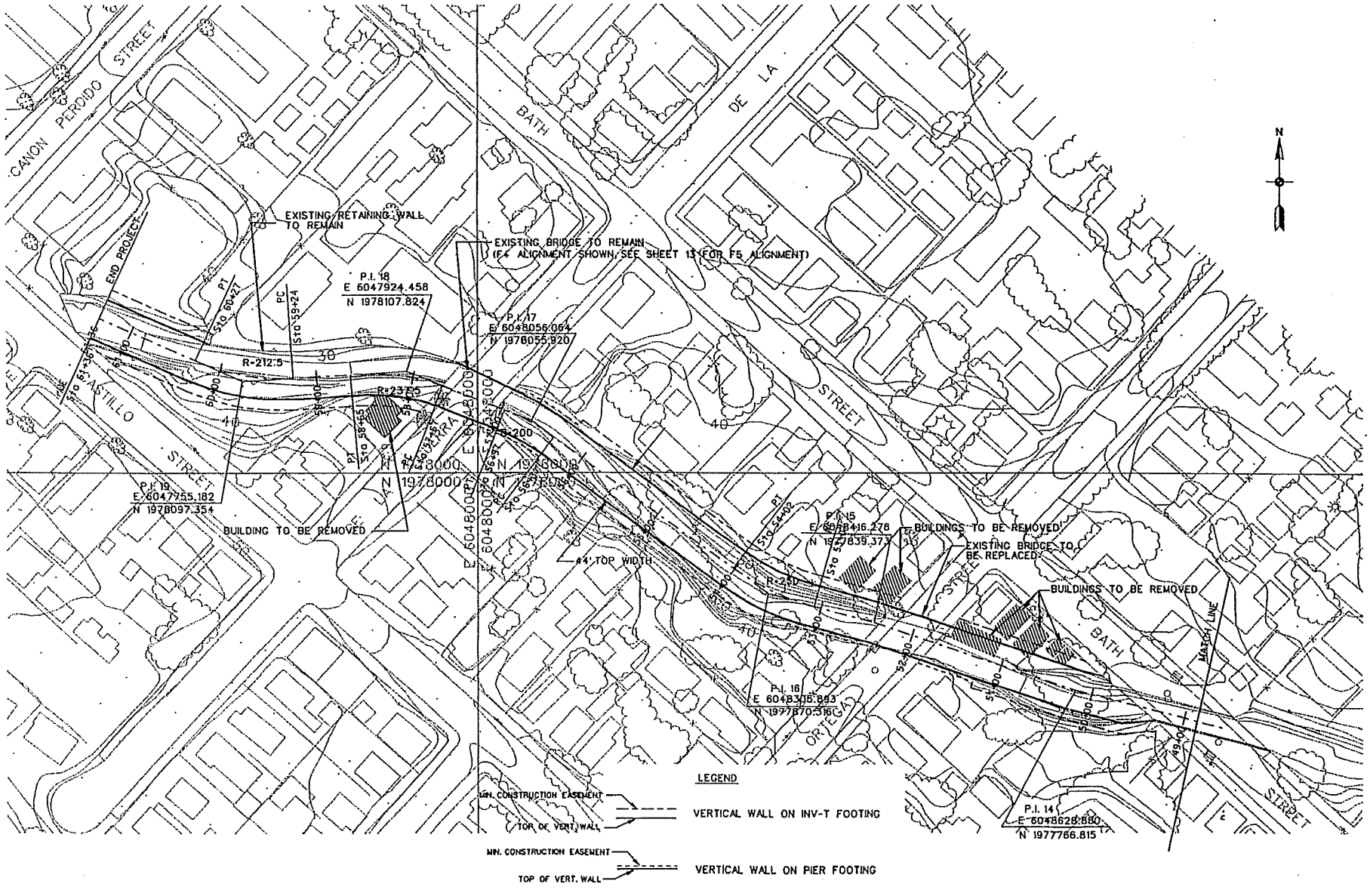
EXHIBIT 6

d:\projects\mission\13\cadd\sbf09d Sep. 13, 1999 15:33:09

Exhibit 7.

ENGINEERING PLANS

Sheets 1 - 28



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
VERTICAL WALL CHANNEL
ALTERNATIVES: 4 & 8

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

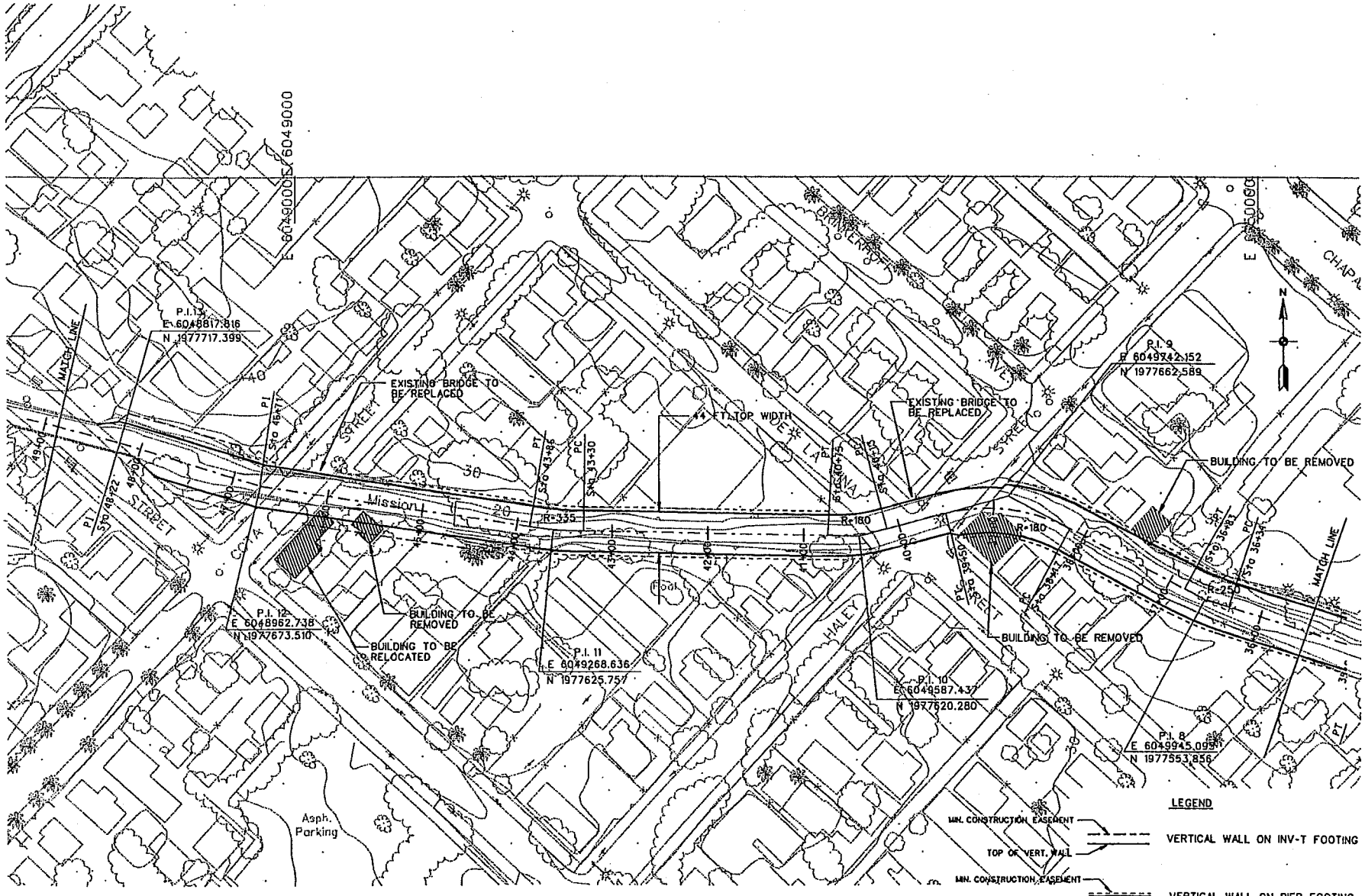
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

CADD FILE NAME: SHEET 3.DGN

DISTRICT FILE NO. 3400

SHEET 1



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
VERTICAL WALL CHANNEL
ALTERNATIVES: 4 & 8

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

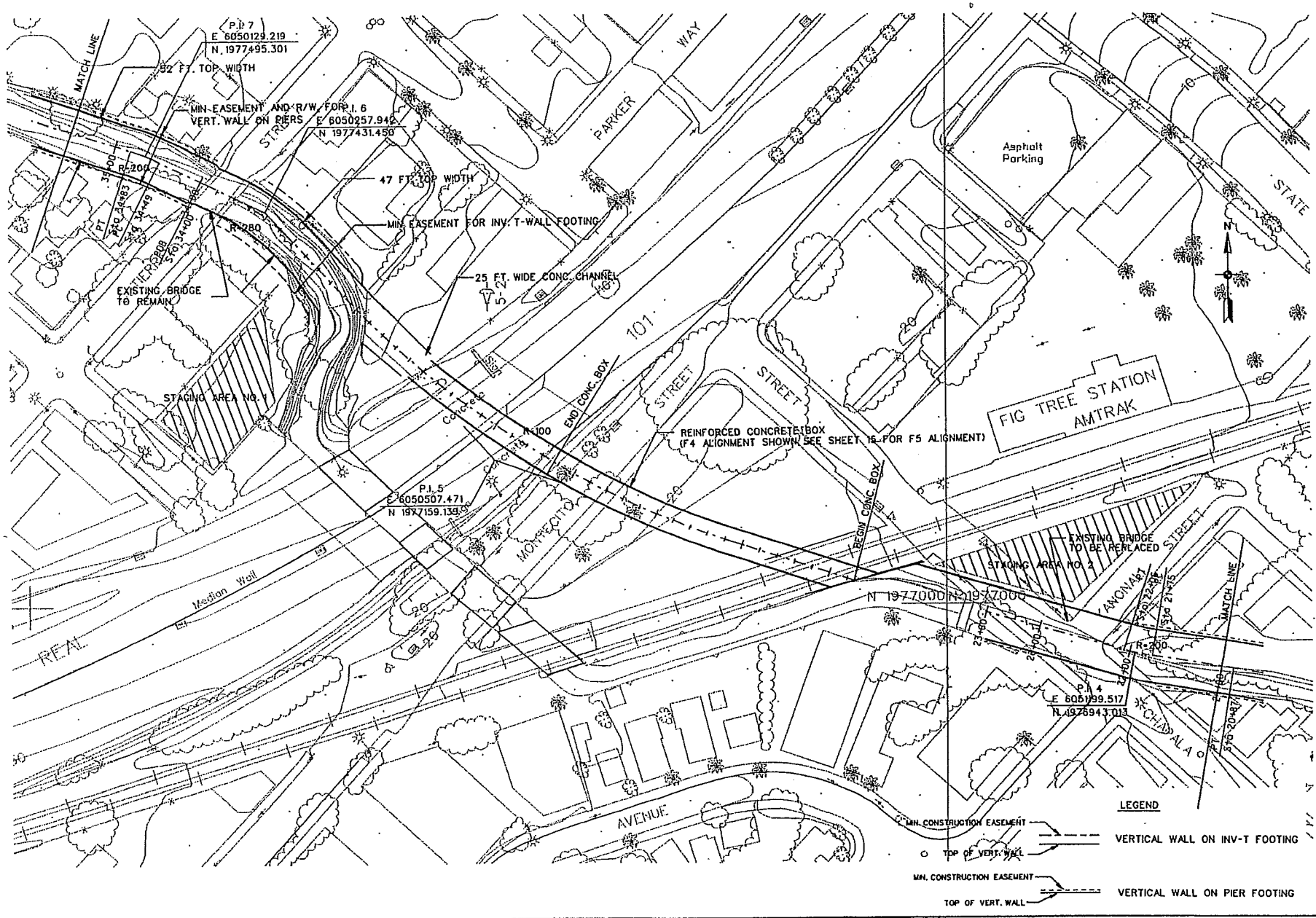
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

CADD FILE NAME/SHEET: 3AP3

DISTRICT FILE NO. 3AM

SHEET 2



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
VERTICAL WALL CHANNEL
ALTERNATIVE 8

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

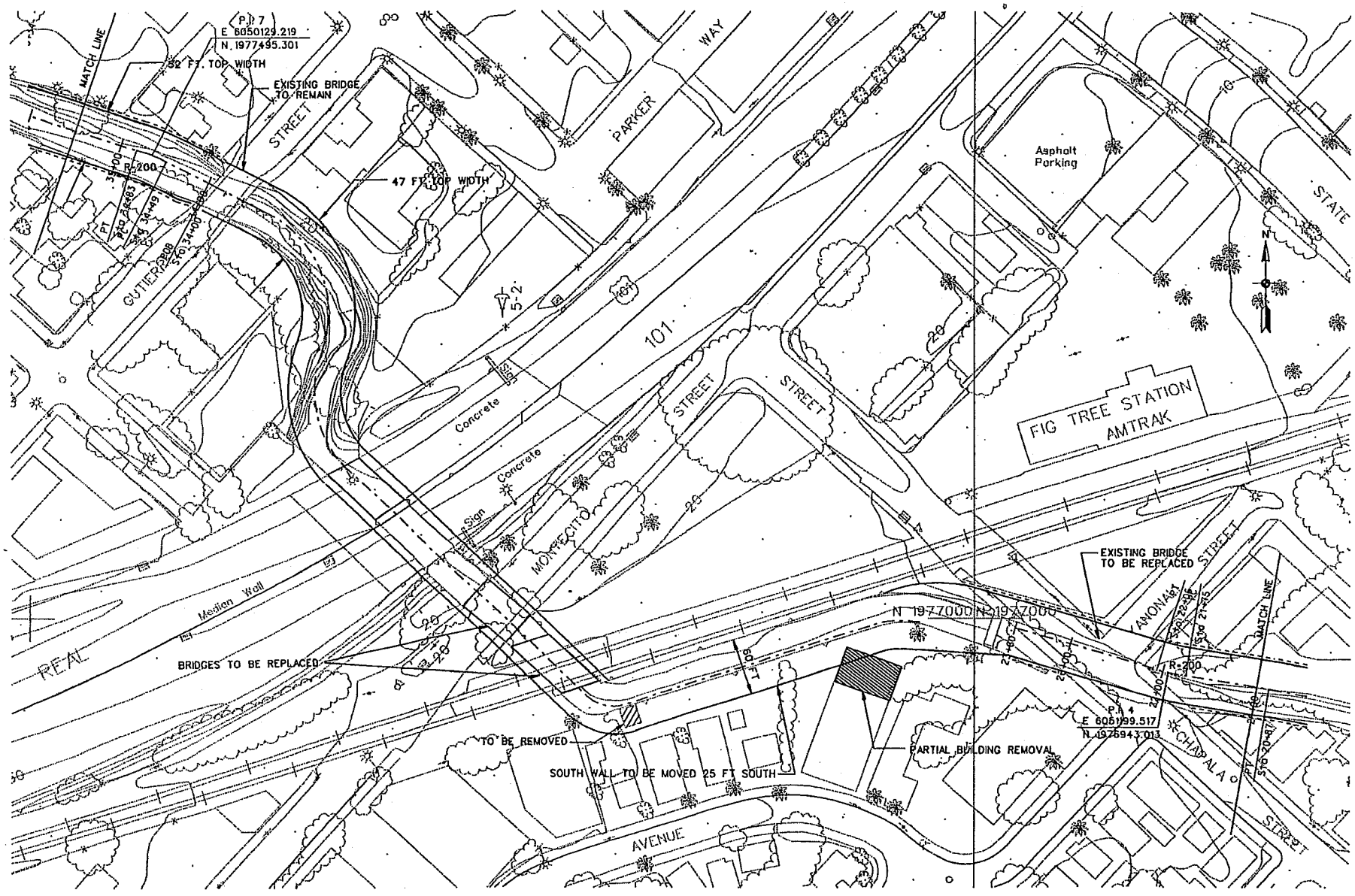
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME: SHEET 3492

DISTRICT FILE NO. 2680

SHEET 3

SYMBOL	DESCRIPTION	DATE	APPROVAL
	REVISIONS		



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
WIDENED OX-BOW ALTERNATIVE
ALTERNATIVE 4,5,6,7

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

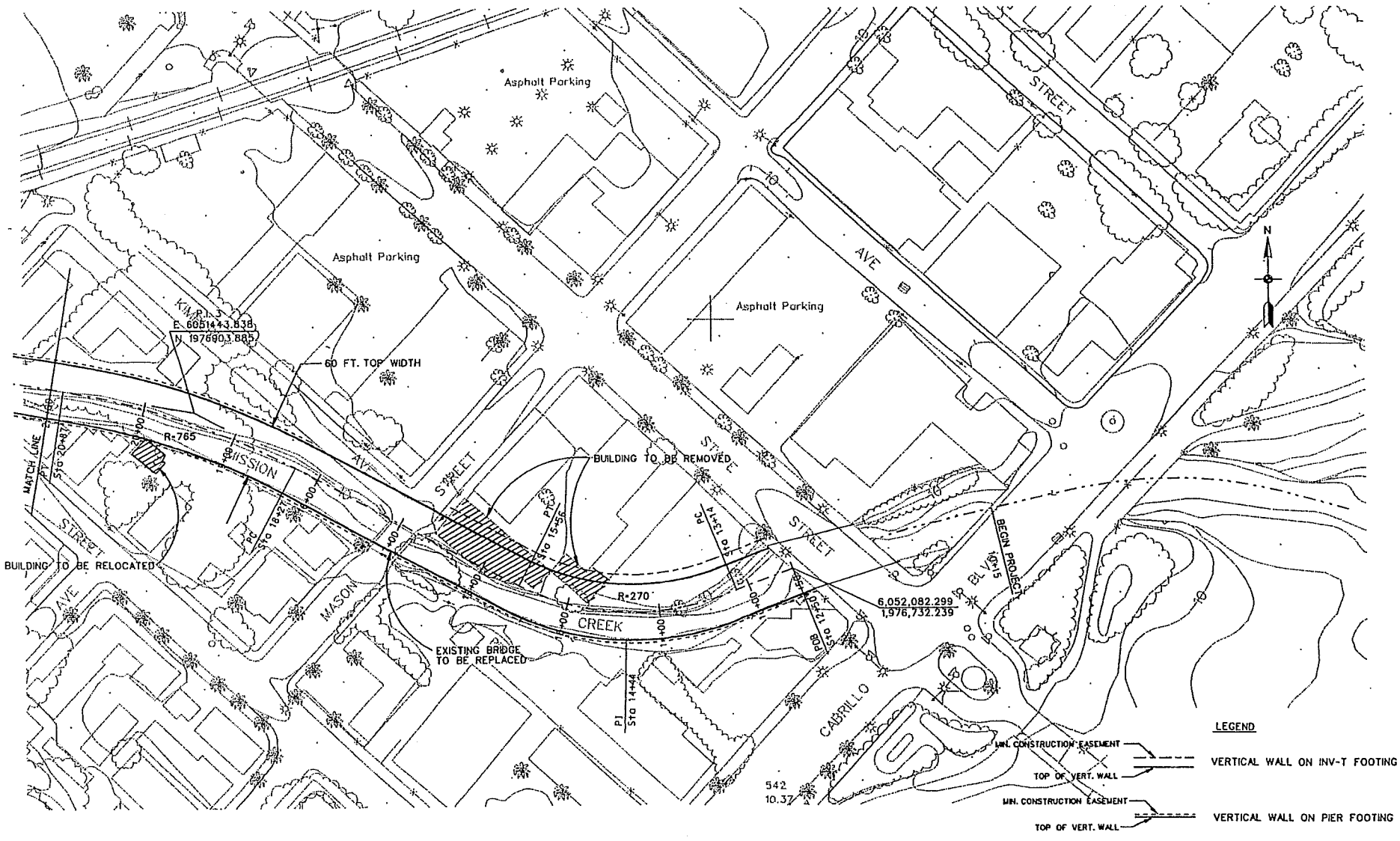
SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME: SHEET 3A(P2)

DISTRICT FILE NO. 2607

SHEET
3A



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
VERTICAL WALL CHANNEL
ALTERNATIVES: 4, 7, 8, 11

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

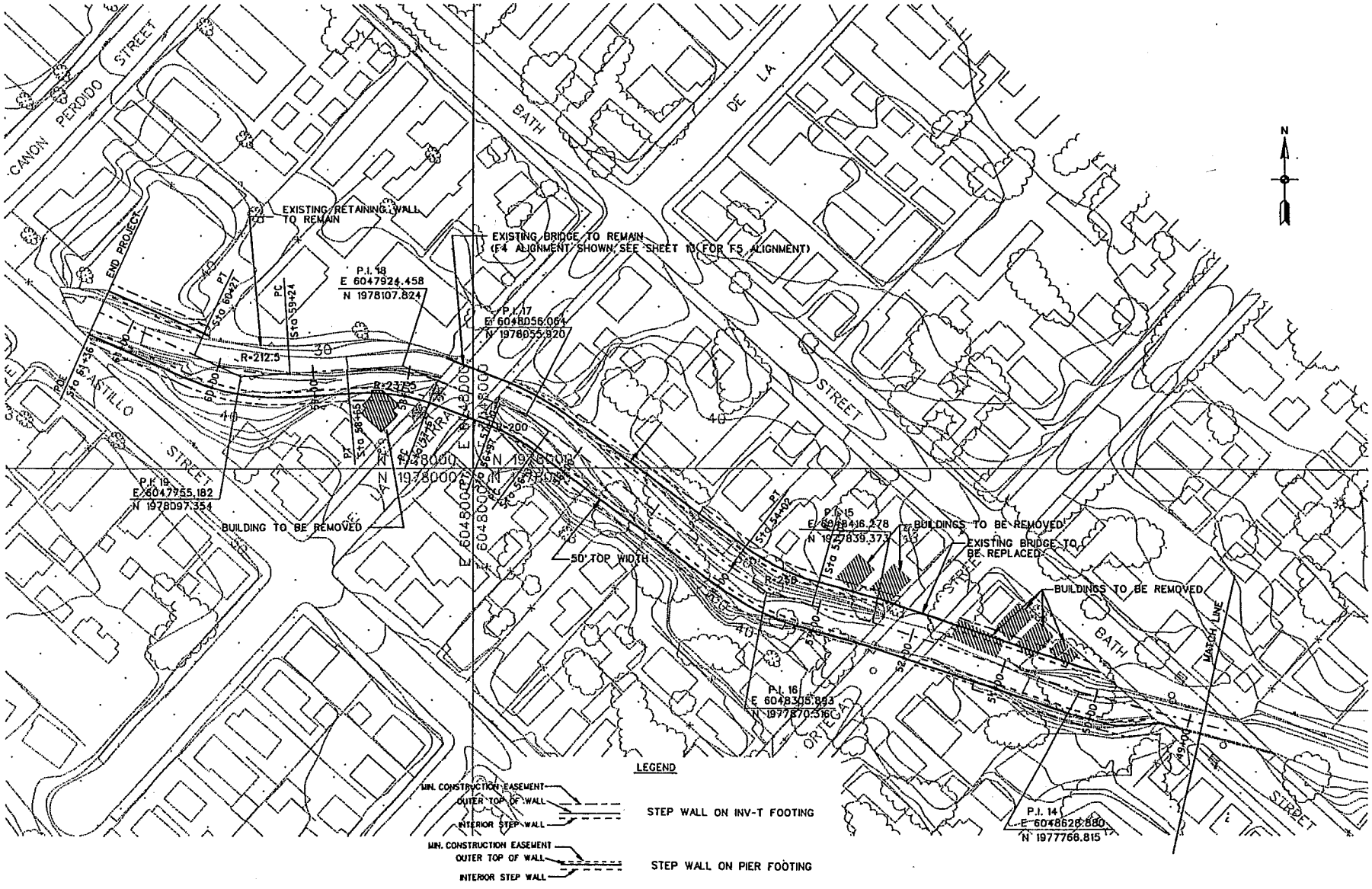
SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME: SHEET 34P1

DISTRICT FILE NO. 2160

SHEET 4



SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
STEP WALL CHANNEL
ALTERNATIVES: 5, 6, 7, 9, 10, 11

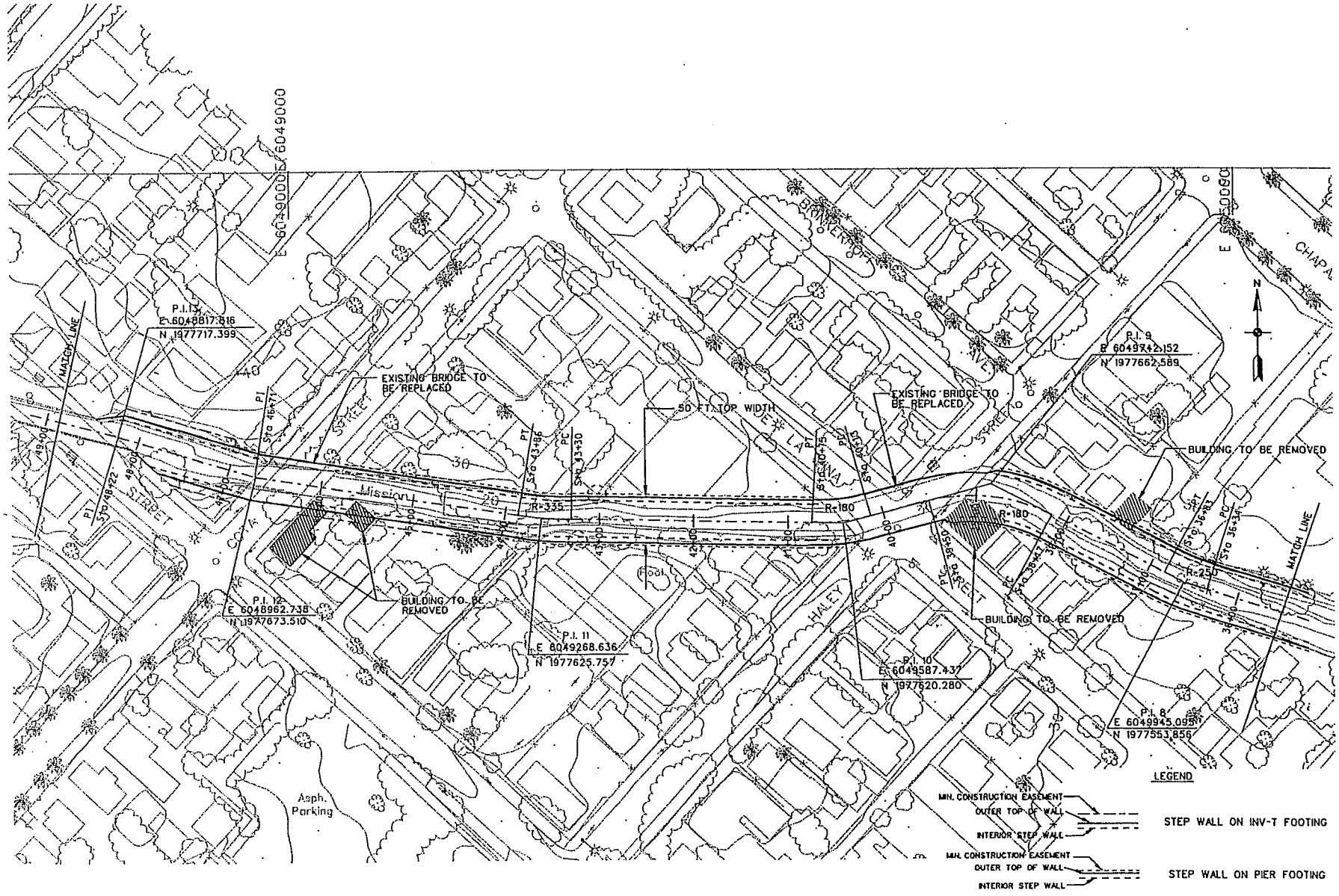
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

DISTRICT FILE NO. 2600
CADD FILE NAME: SHEET 34P4

SHEET 5



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
STEP WALL CHANNEL
ALTERNATIVES: 5, 6, 7, 8, 10, 11

SYMBOL	DESCRIPTION	DATE	APPROVAL

REVISIONS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

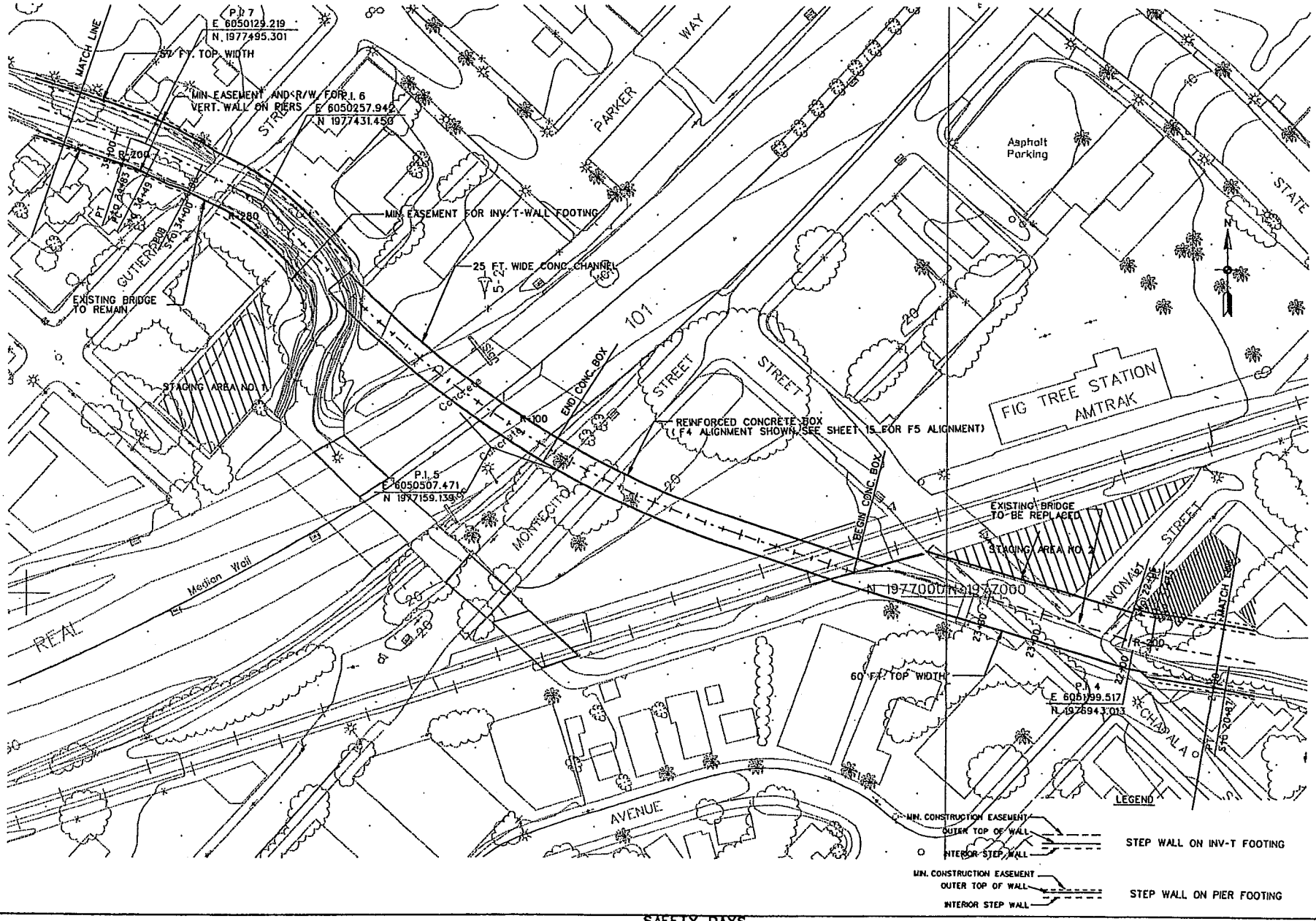
SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME: SHEET 3493

DISTRICT FILE NO. 2667

SHEET 6



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
STEP WALL CHANNEL
ALTERNATIVES: 8, 10, 11

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

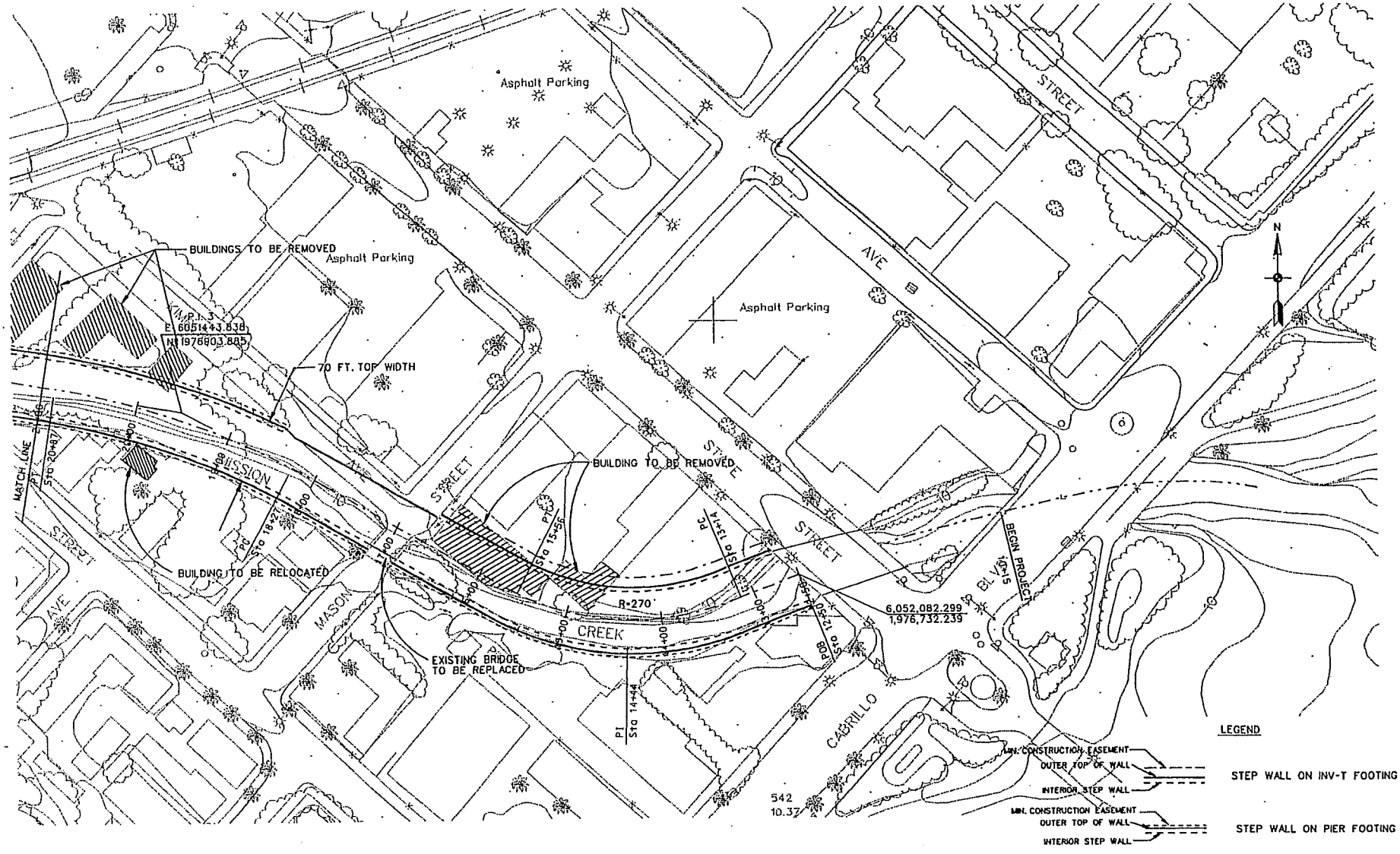
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

SUBMITTED BY:
JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

CADD FILE NAME: SHEET 3-4P2

DISTRICT FILE NO. 2667

SHEET
7



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
STEP WALL CHANNEL
ALTERNATIVES: 5 & 9

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

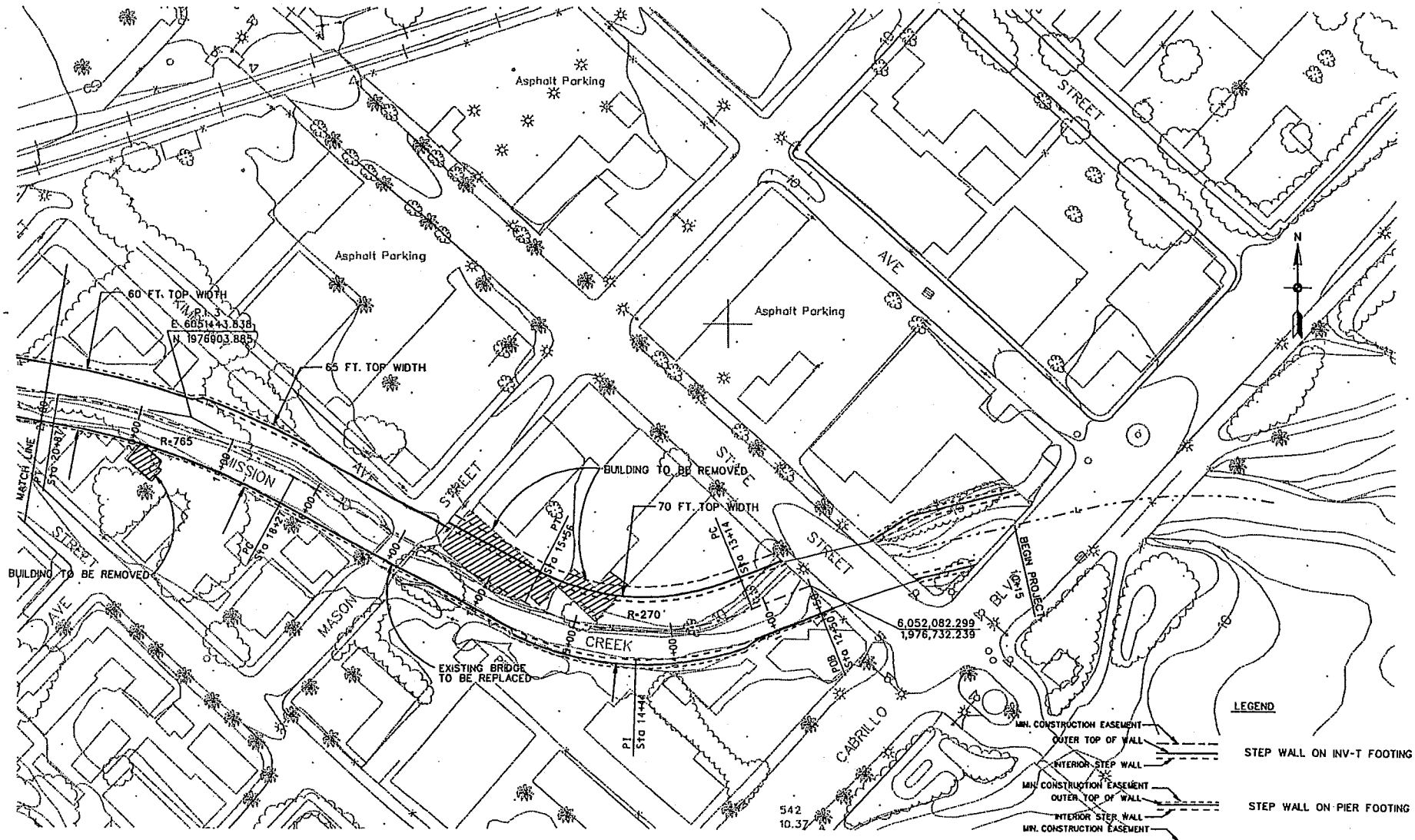
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME: SHEET 3-P1

DISTRICT FILE NO. 2680

SHEET 8

VALUE ENGINEERING PAYS



SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
ALTERNATIVE 6 AND ALTERNATIVE 10
PARTIAL STEP WALLS D/S OF HWY 101

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

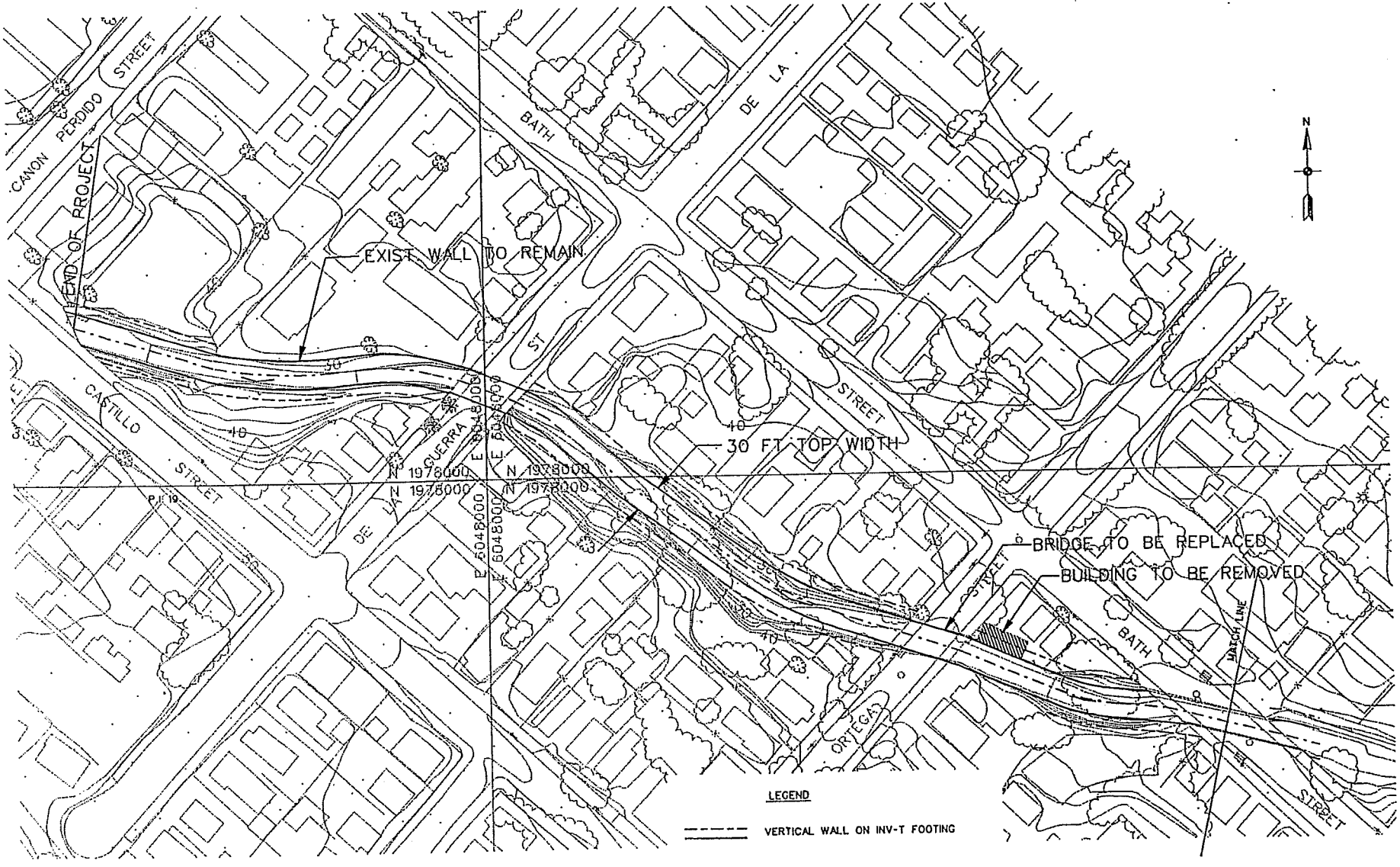
SUBMITTED BY:
THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DISTRICT FILE NO. 2600

CADD FILE NAME: SHEET 34P1

SHEET
8A

SAFETY PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
2500 CFS ALTERNATIVE
VERTICAL WALLS
ALTERNATIVE 3

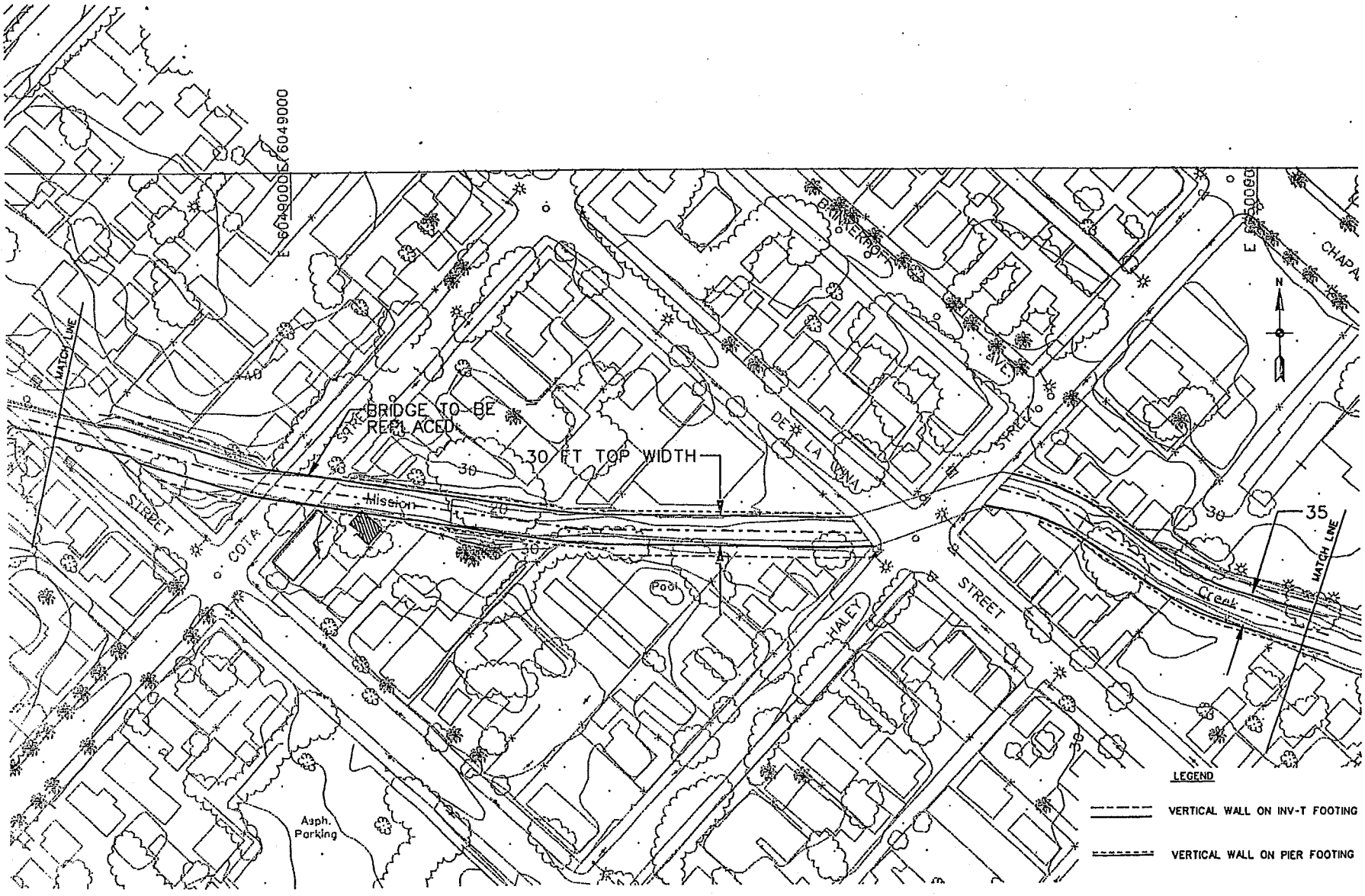
SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: BT
DRAWN BY: BT
CHECKED BY: BT

SHEET 9



U.S. ARMY ENGINEER DISTRICT LOS ANGELES CORPS OF ENGINEERS

SUBMITTED BY: JAMES M. CRUM, P.E. CHIEF, DESIGN BRANCH

DISTRICT FILE NO. 3687

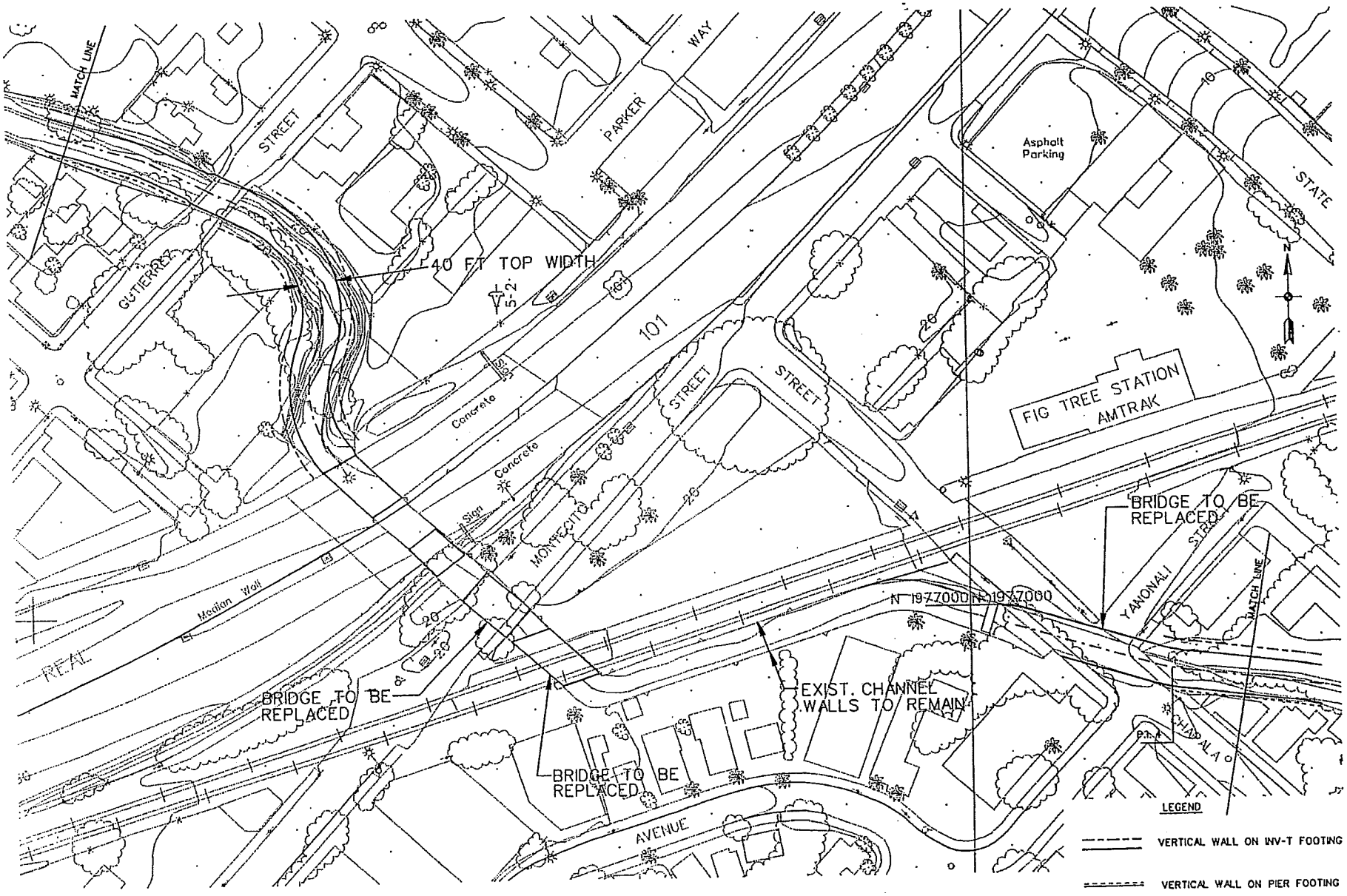
DESIGNED BY: DRAWN BY: CHECKED BY:

CADD FILE NAME/SHEET 2593

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
2500 CFS ALTERNATIVE
VERTICAL WALLS
ALTERNATIVE 3

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

SHEET 10



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
2500 CFS ALTERNATIVE
VERTICAL WALLS
ALTERNATIVE 3

SYMBOL	DESCRIPTION	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

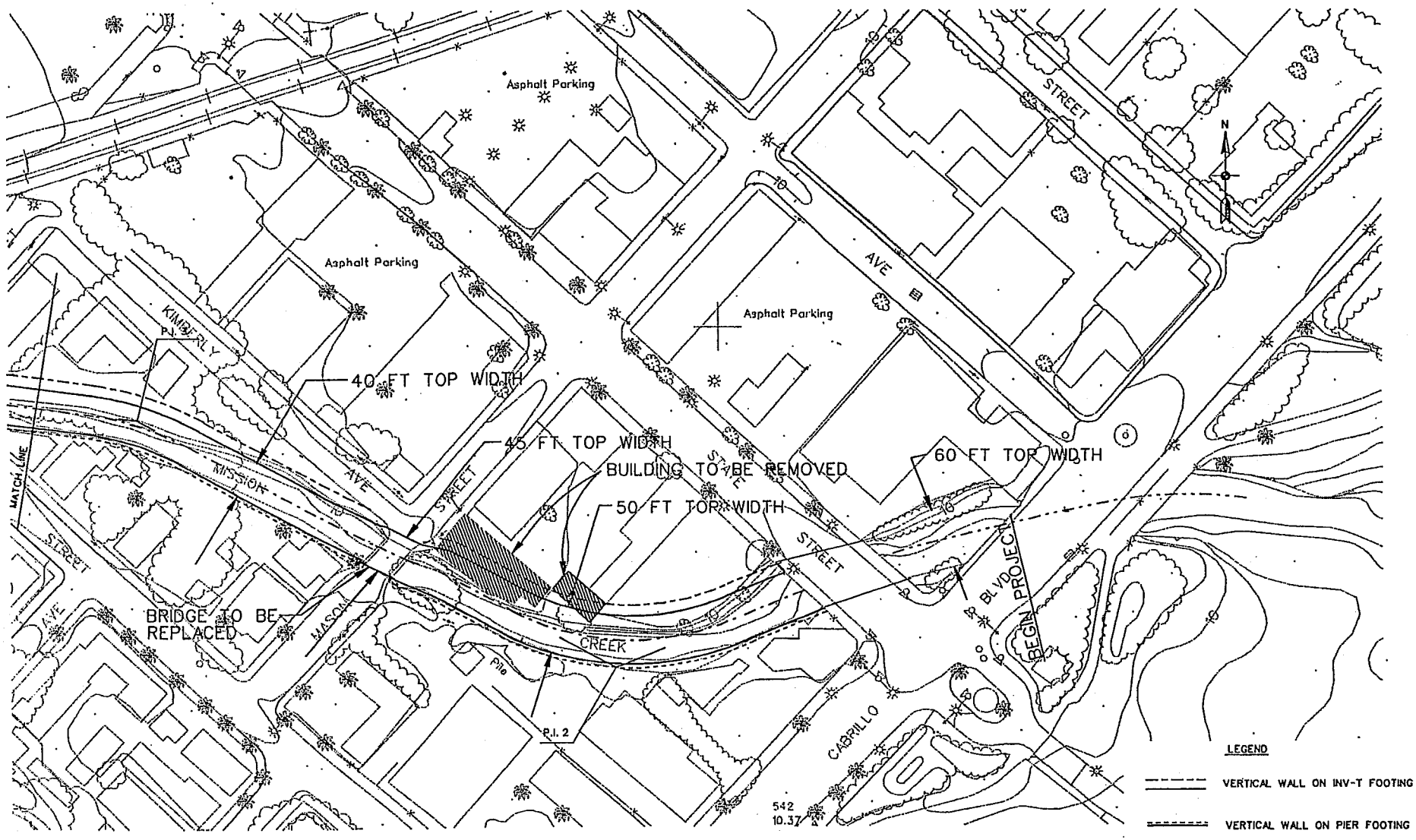
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

SUBMITTED BY: JAMES M. CRUM, P.E.
CHIF, DESIGN BRANCH

CADD FILE NAME: SHEET 23P2

DISTRICT FILE NO. 2600

SHEET 11



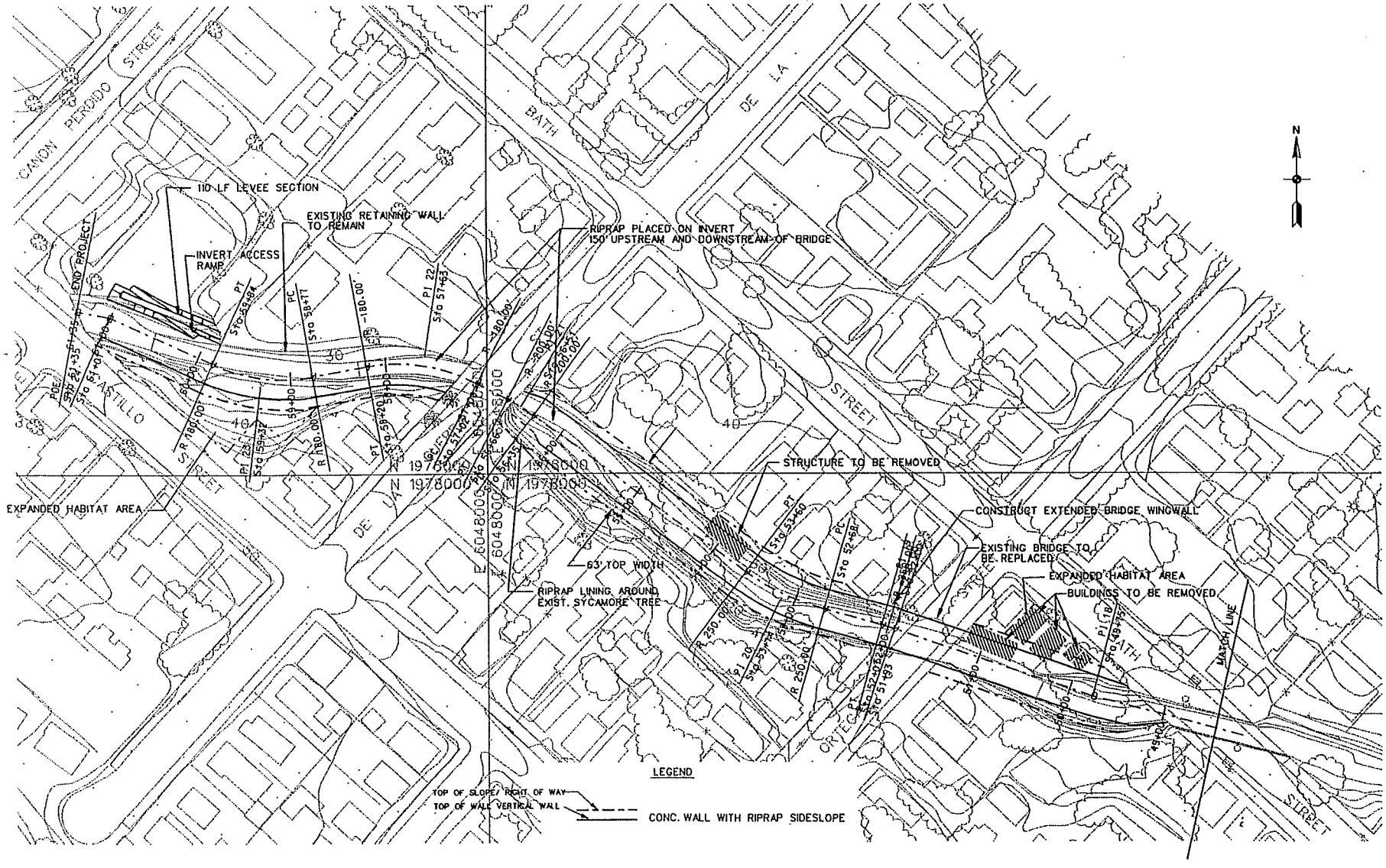
LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
2500 CFS ALTERNATIVE
VERTICAL WALLS
ALTERNATIVE 3

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

SHEET 12

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
ALTERNATIVE 12 (WITH P5 DESIGN OPTIMIZATIONS)
RECOMMENDED ALTERNATIVE

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

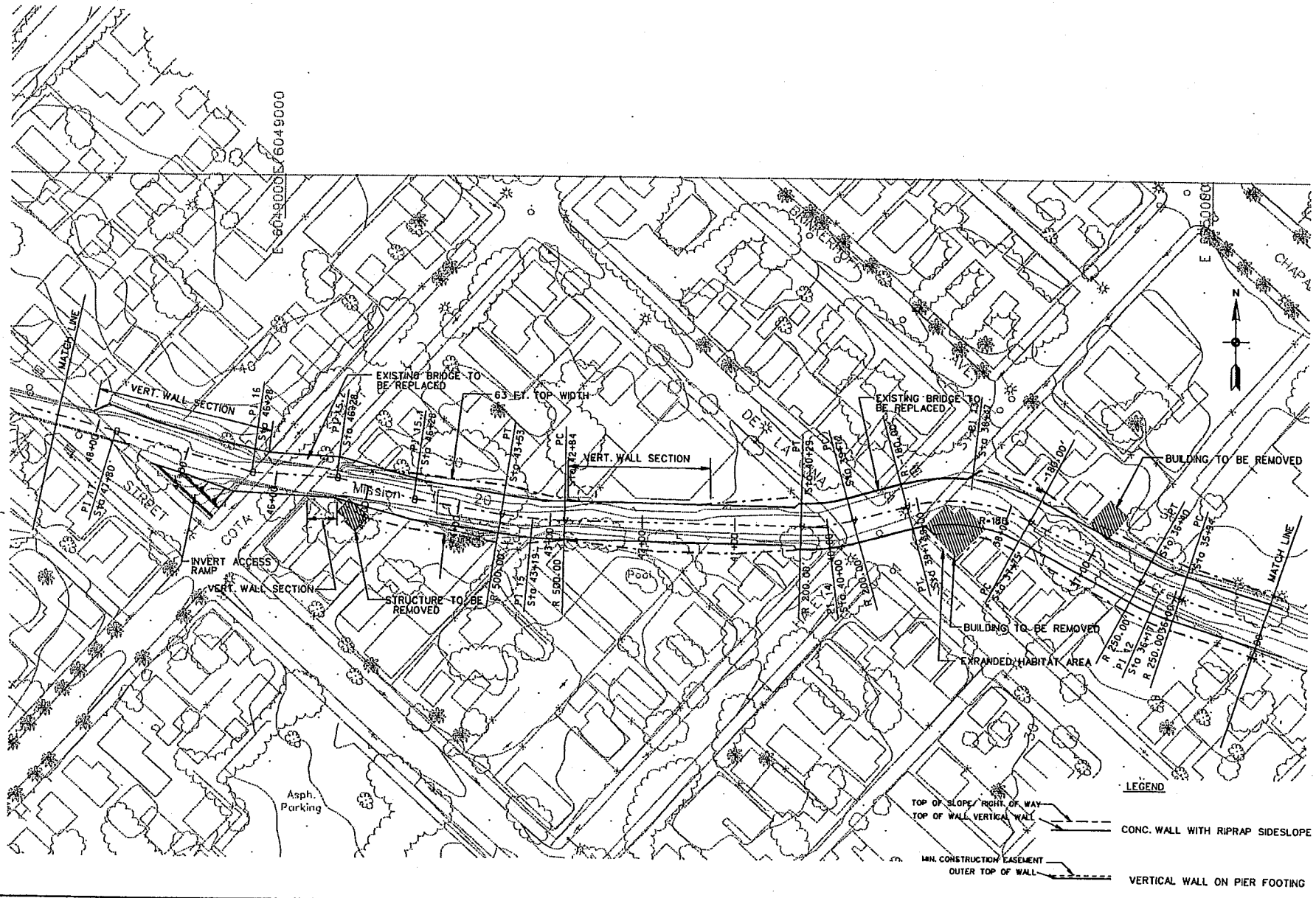
DISTRICT FILE NO. 2800

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME: SHEET 34.DWG

SHEET 13

SAFETY PAYS

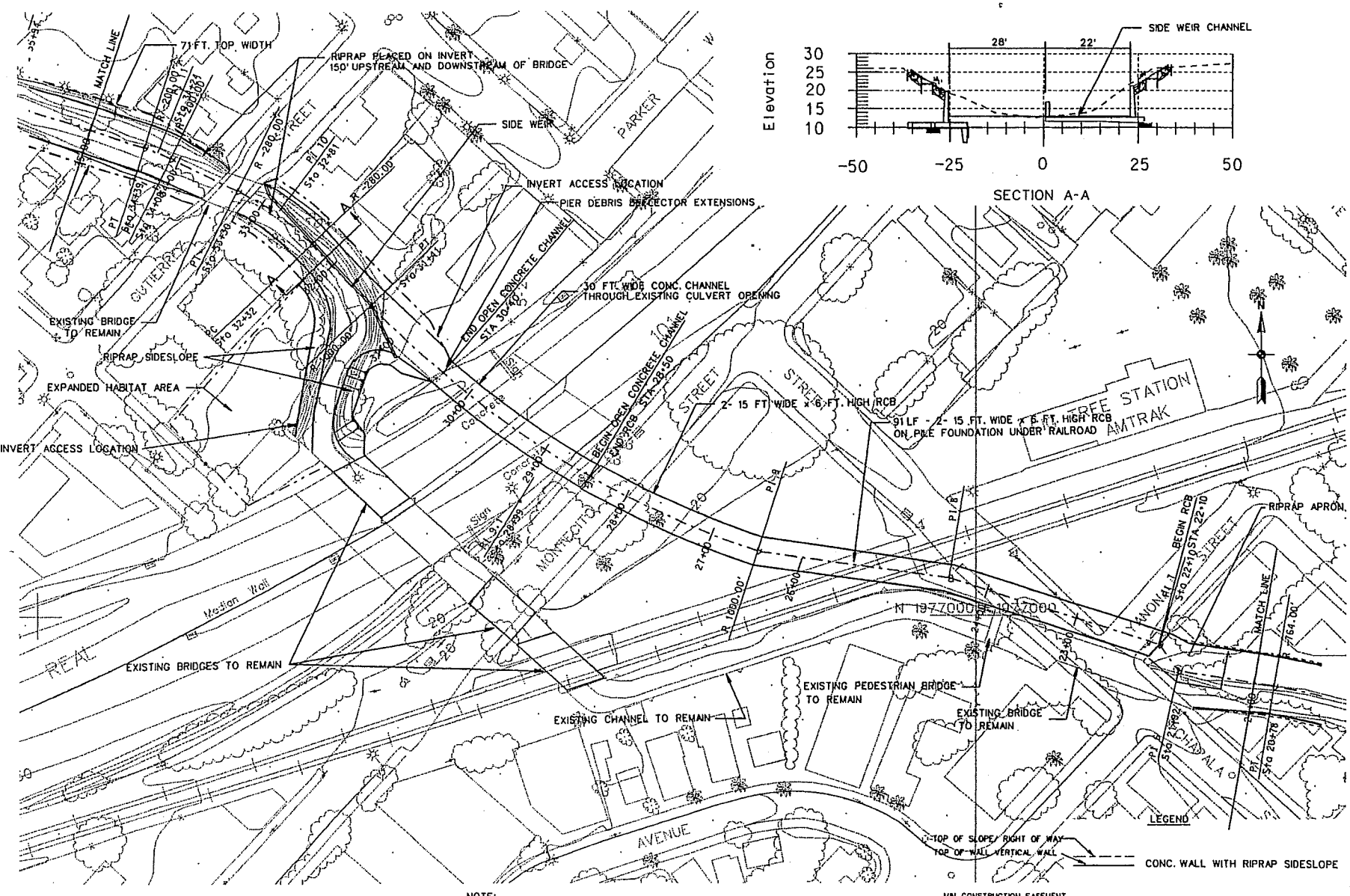


LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
ALTERNATIVE 12 (WITH F5 DESIGN OPTIMIZATIONS)
RECOMMENDED ALTERNATIVE

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

SHEET 14



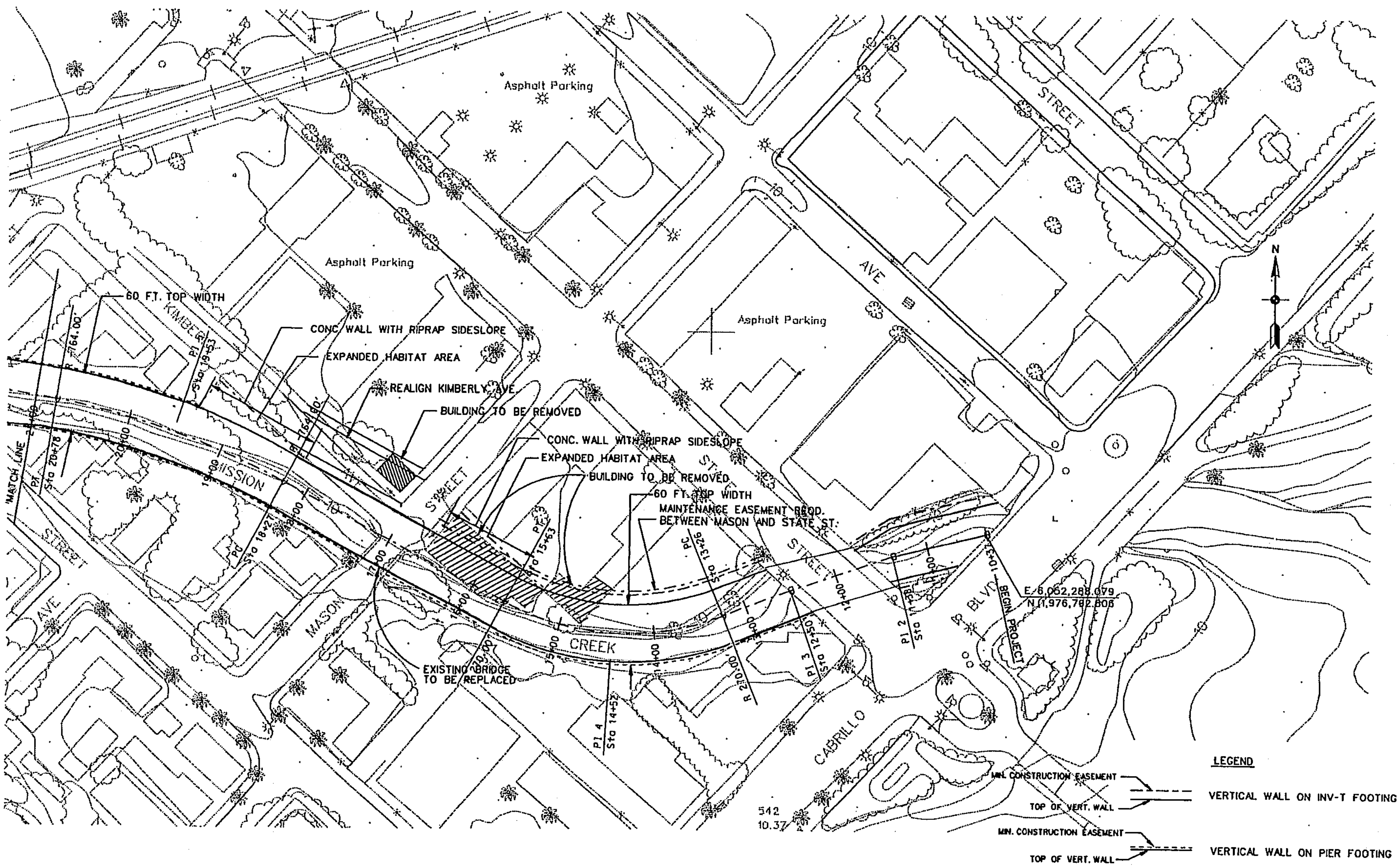
NOTE:
SEE SHEET 7 FOR STAGING AREA LOCATIONS

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
ALTERNATIVE 12 (WITH F5 DESIGN OPTIMIZATIONS)
RECOMMENDED ALTERNATIVE

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

SHEET 15



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
ALTERNATIVE 12 (WITH F5 DESIGN OPTIMIZATIONS)
RECOMMENDED ALTERNATIVE

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

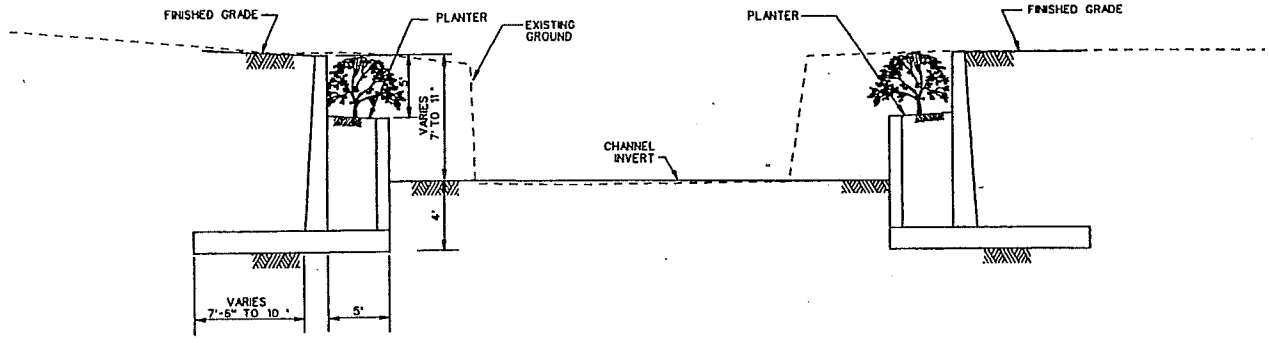
U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

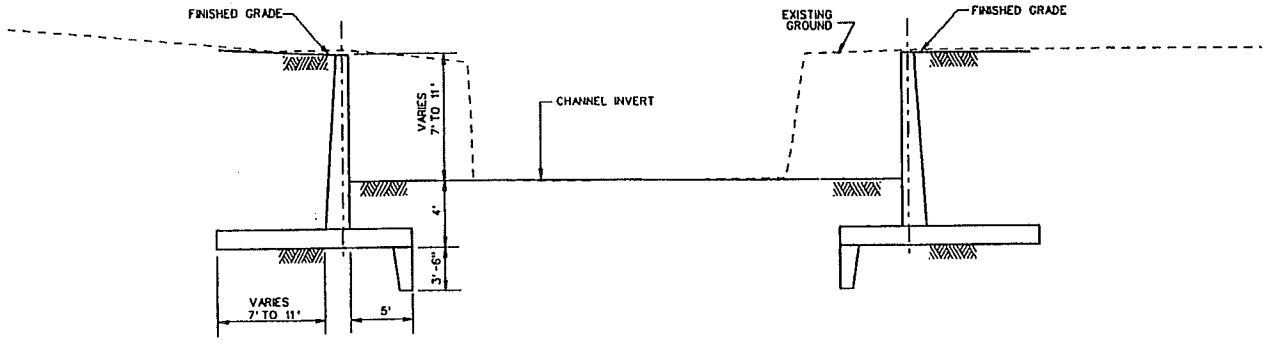
SUBMITTED BY:
THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DISTRICT FILE NO.
CADD FILE NAME: SHEET 34P1

SHEET
16



TYPICAL CROSS SECTION
STEP WALL ON INVERTED T FOOTING
*NOT TO SCALE



TYPICAL CROSS SECTION
VERTICAL WALL ON INVERTED T FOOTING
*NOT TO SCALE

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
TYPICAL CROSS SECTIONS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

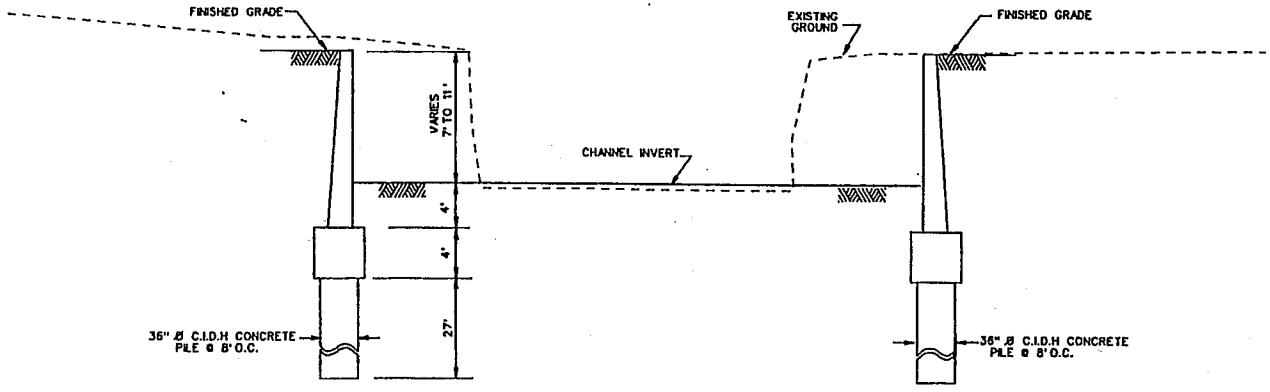
SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME:

DISTRICT FILE NO. 2604

SHEET 17



TYPICAL CROSS SECTION
VERTICAL WALL ON PIER FOOTING

*NOT TO SCALE

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
TYPICAL CROSS SECTIONS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

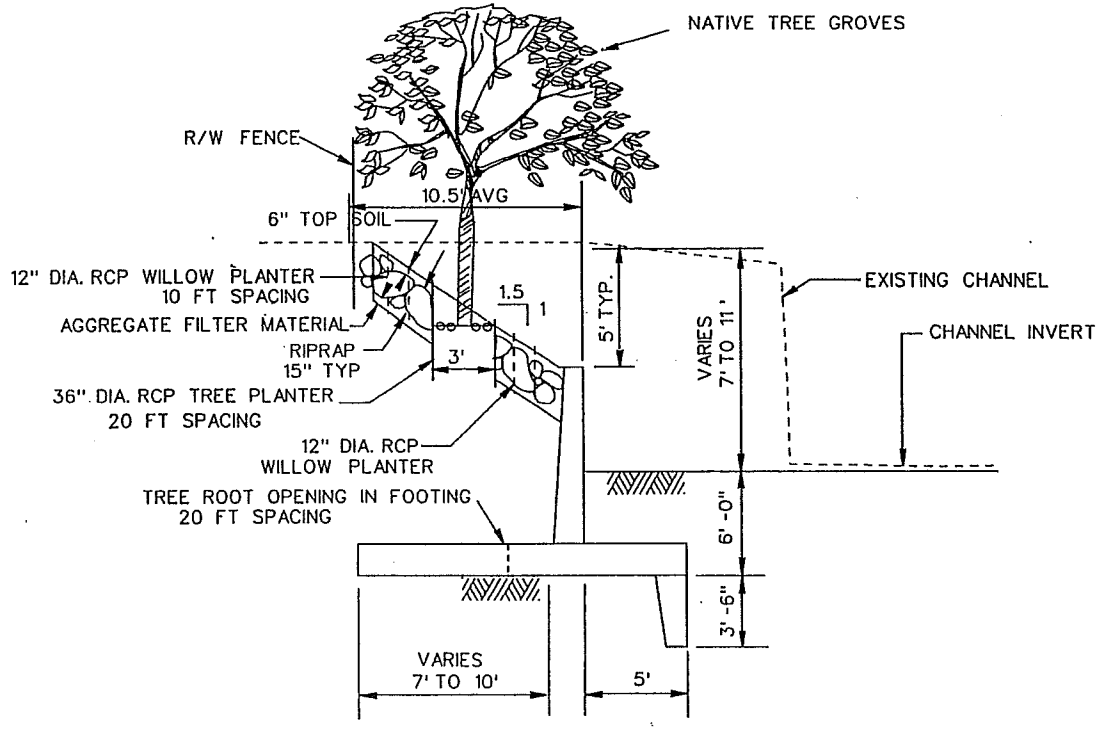
SUBMITTED BY: JAMES M. CRUM, P.E.
CHIEF, DESIGN BRANCH

DISTRICT FILE NO. 2404

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME:

SHEET 18



RIPRAP WALL ALTERNATIVE

SCALE: NOT TO SCALE

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
RIPRAP WALL ALTERNATIVE CROSS SECTION

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

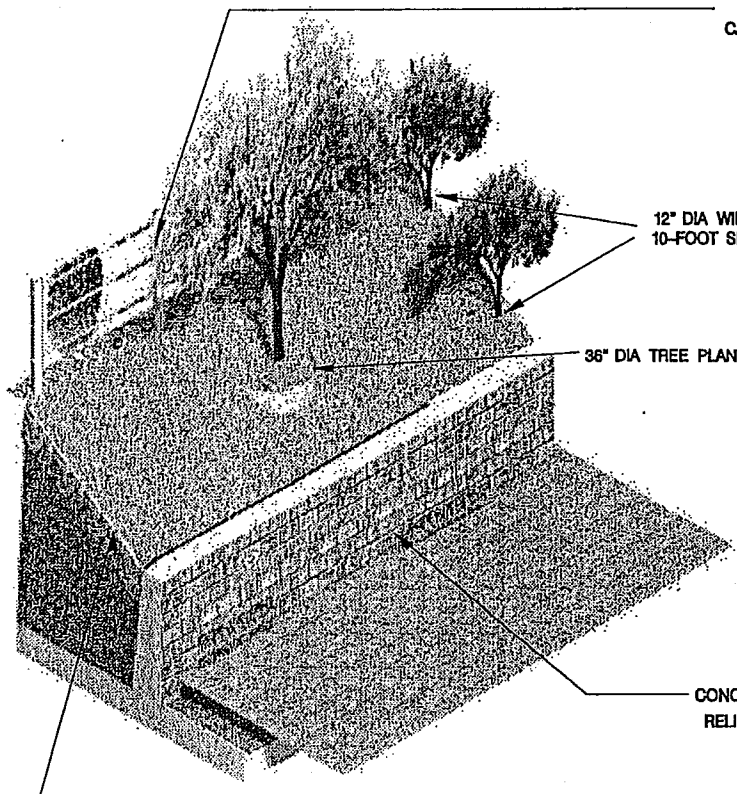
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

CADD FILE NAME:

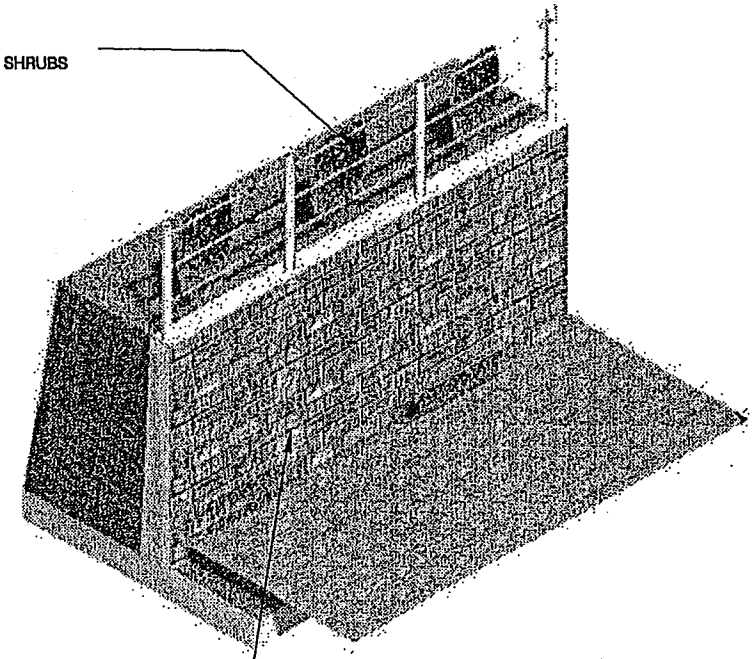
DISTRICT FILE NO. 2667

SHEET 19



WALL WITH RIPRAP SIDESLOPE

NOT TO SCALE



VERTICAL WALL

NOT TO SCALE

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS ALTERNATIVE
CHANNEL WALL TYPICAL ESTHETIC FEATURES

SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

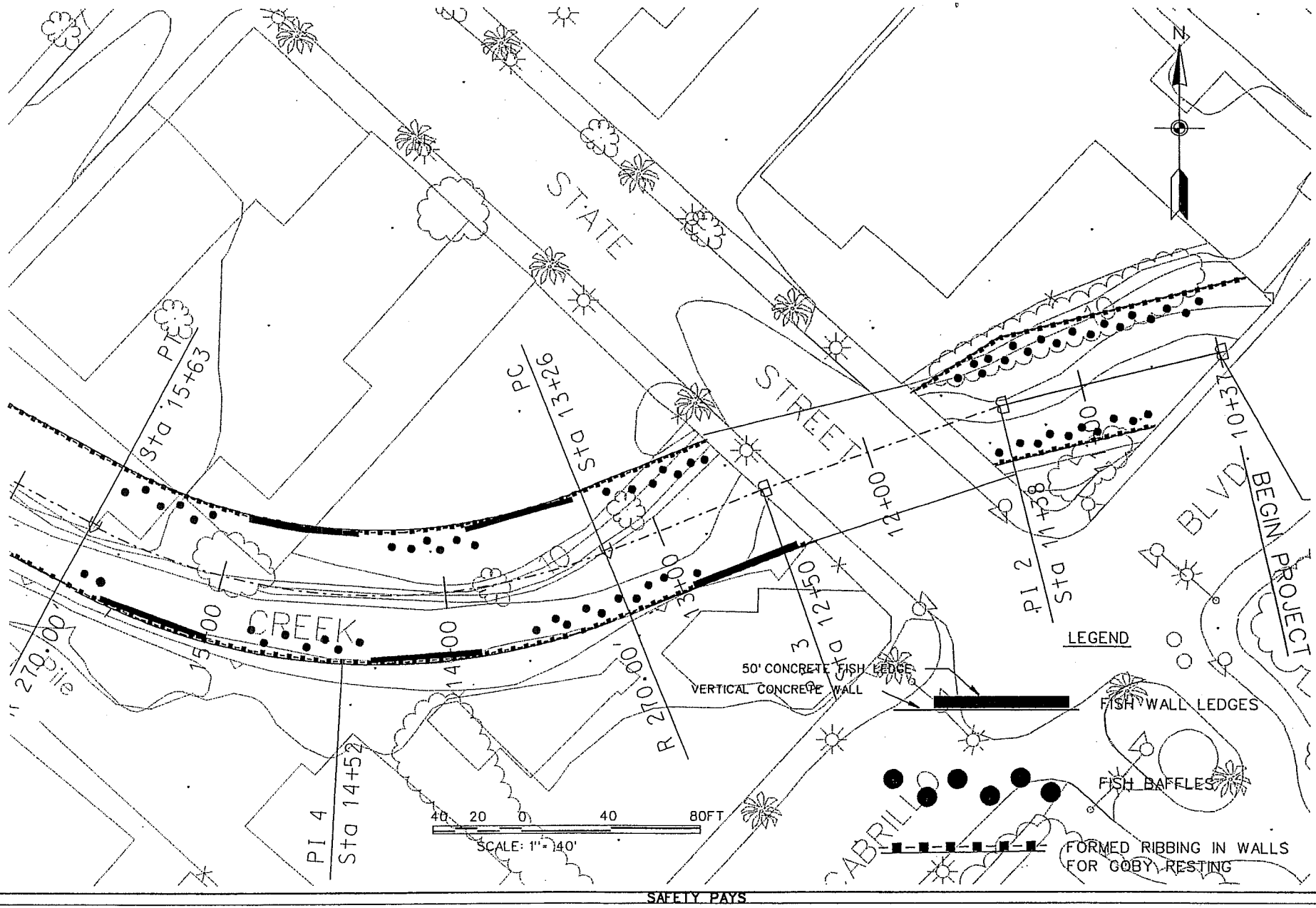
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME:

DISTRICT FILE NO. 2907

SHEET 20

VALUE ENGINEERING PAYS



LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

CADD FILE NAME:

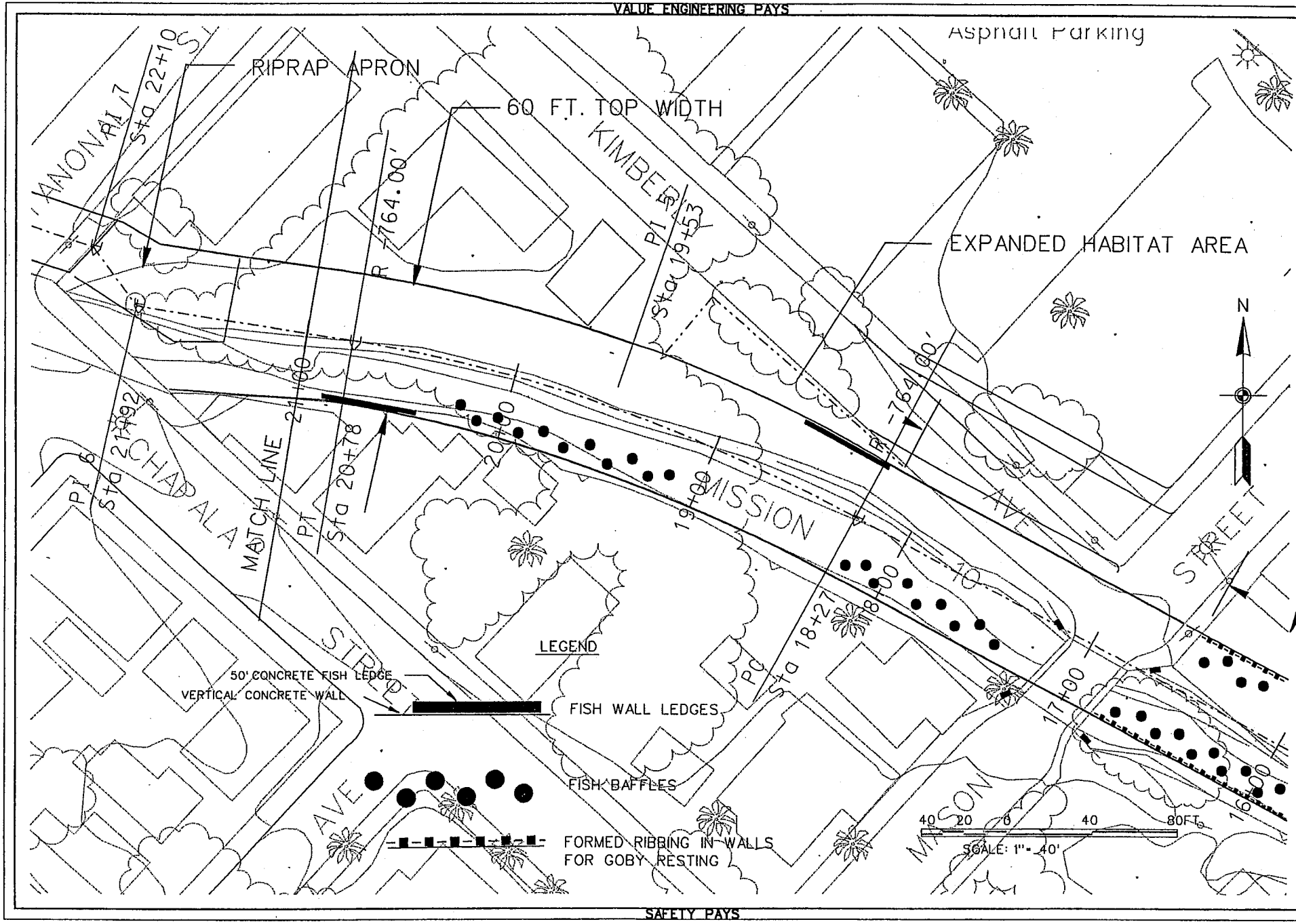
DISTRICT FILE NO. 3660

SYMBOL | DESCRIPTIONS | DATE | APPROVAL
REVISIONS

SHEET 21

SAFETY PAYS

VALUE ENGINEERING PAYS



SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

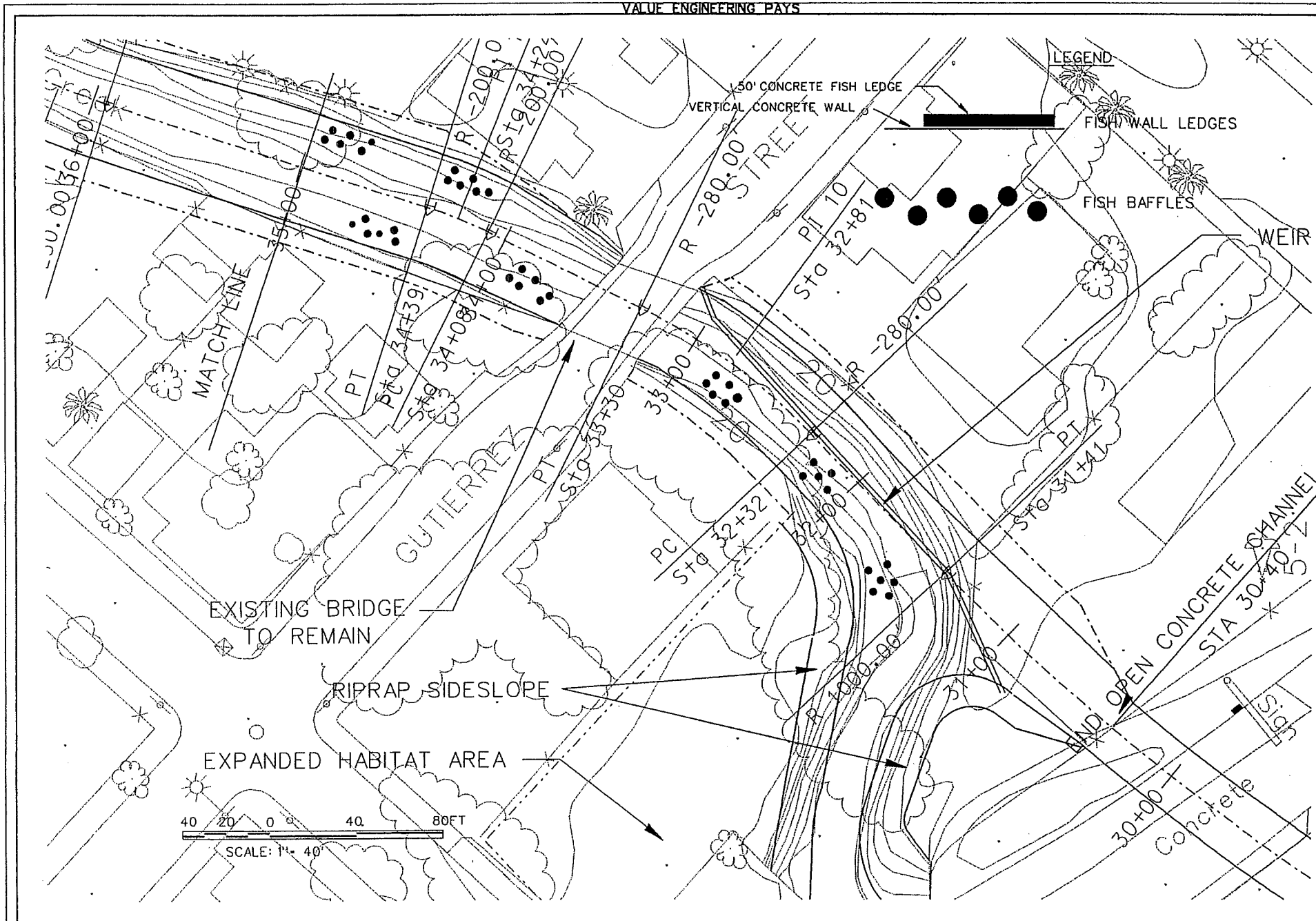
CADD FILE NAME:

DISTRICT FILE NO. 2604

SHEET 22

SAFETY PAYS

VALUE ENGINEERING PAYS



SYMBOL	DESCRIPTIONS	DATE	APPROVAL

REVISIONS

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

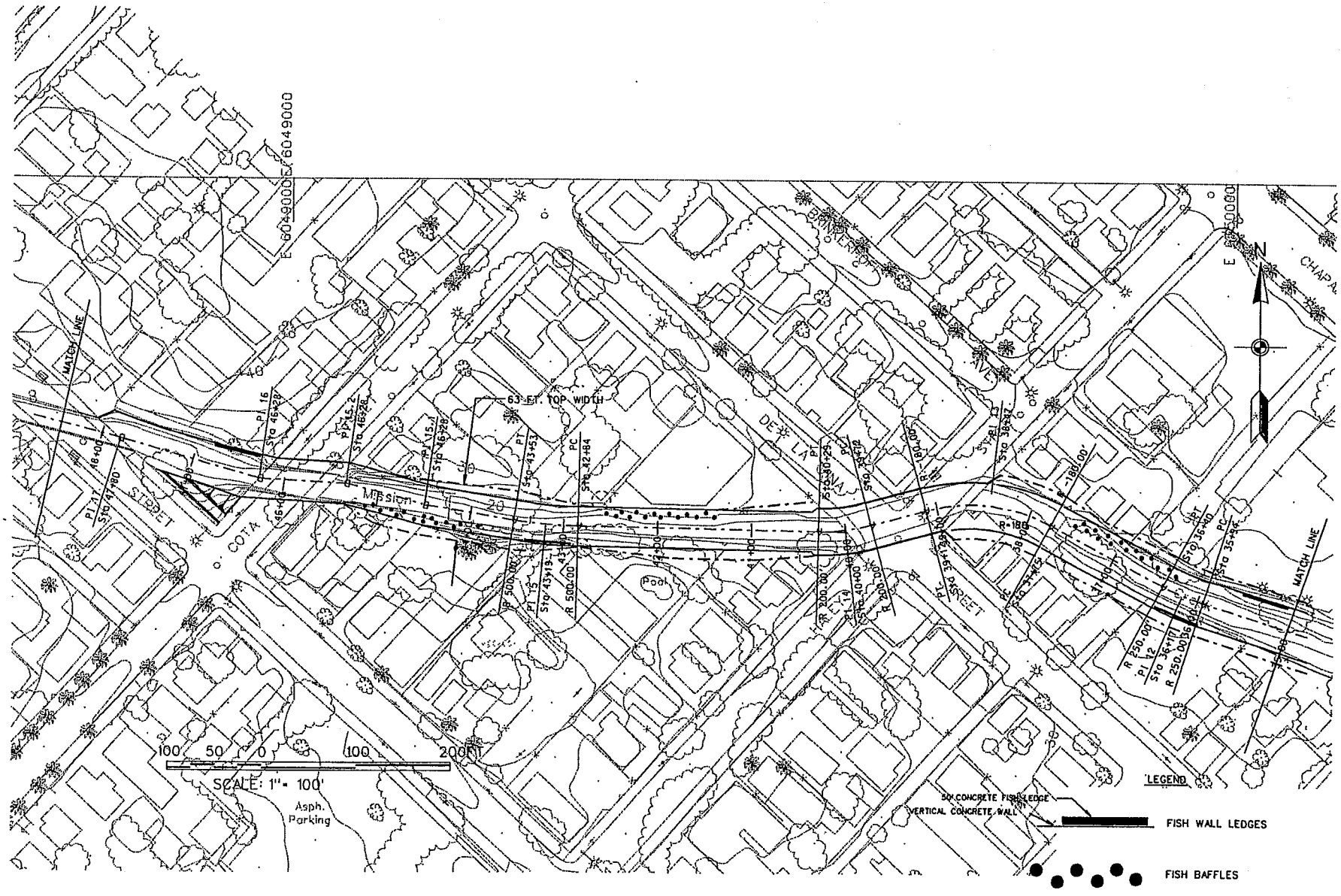
DESIGNED BY: XX
DRAWN BY: XX
CHECKED BY: XX

CADD FILE NAME:

DISTRICT FILE NO. 2604

SHEET 23

SAFETY PAYS



U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

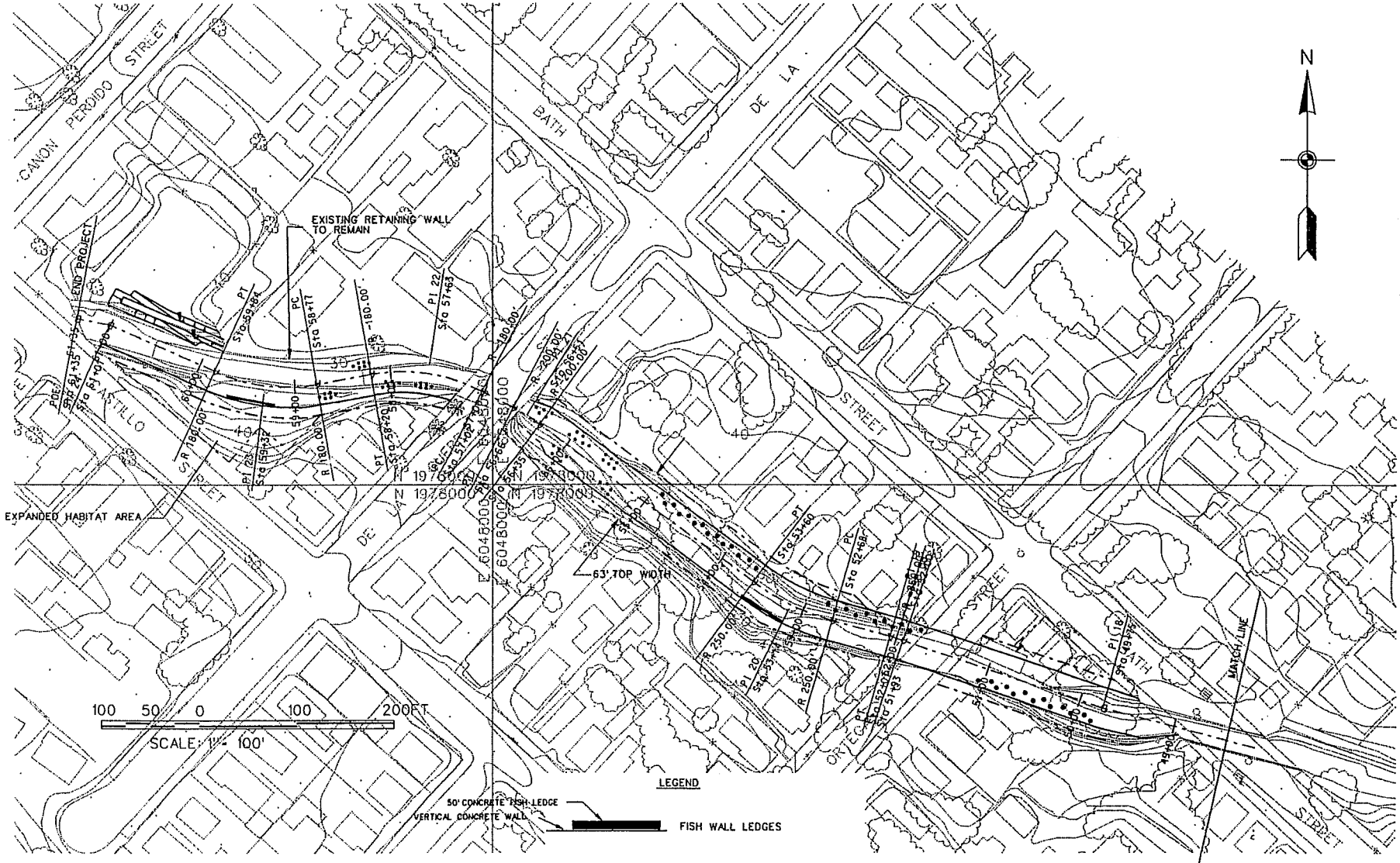
DISTRICT FILE NO. 3MAV
CARD FILE NAME/SHEET 34P3

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

SHEET 24

VALUE ENGINEERING PAYS



U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

DISTRICT FILE NO. 3800/

CARD FILE NAME: SHEET 34P4

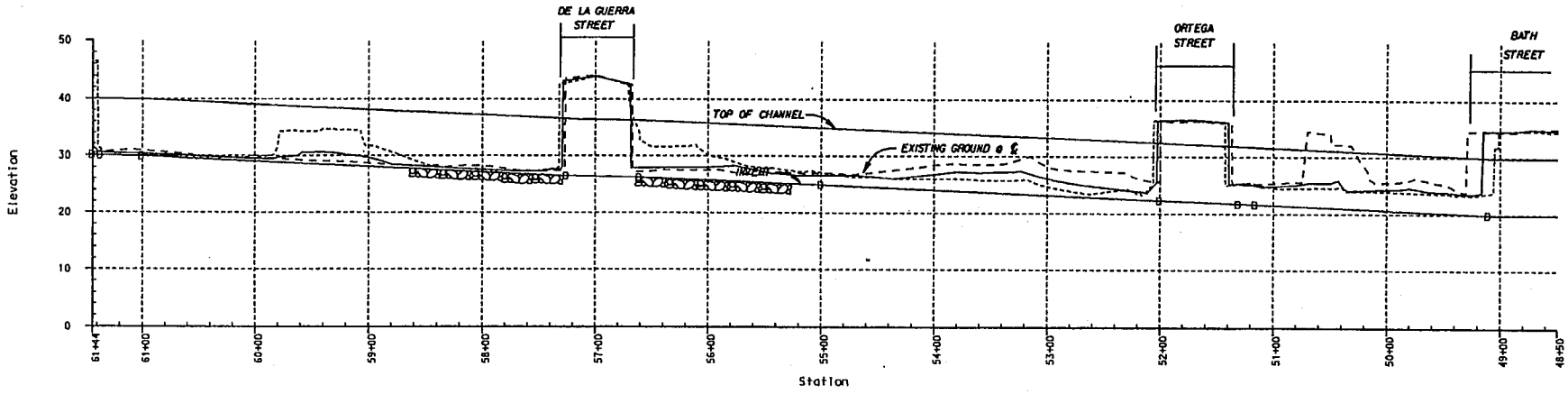
LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
STEELHEAD LEDGES, BAFFLES, AND GOBBY WALL PROTECTION

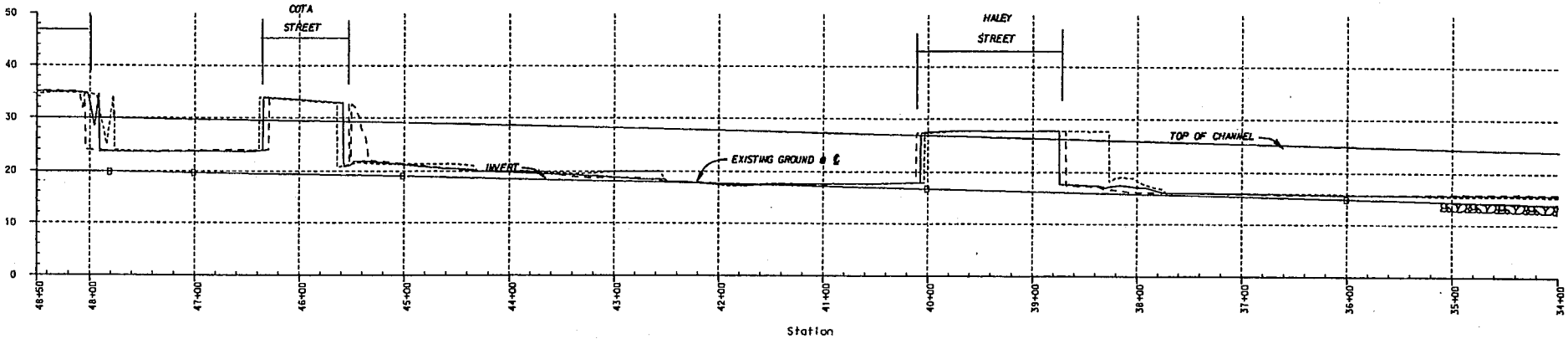
SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

SHEET 25

SAFETY PAYS

VALUE ENGINEERING PAYS





LEGEND	
LINE	GROUND OFFSET FROM CL
———	0.00
- - - - -	-7.00
— — —	7.00

20 10 0 20 40FT

SCALE: 1"= 20'

100 50 0 100 200FT

SCALE: 1"= 100'

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
	REVISIONS		

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
PROFILE

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

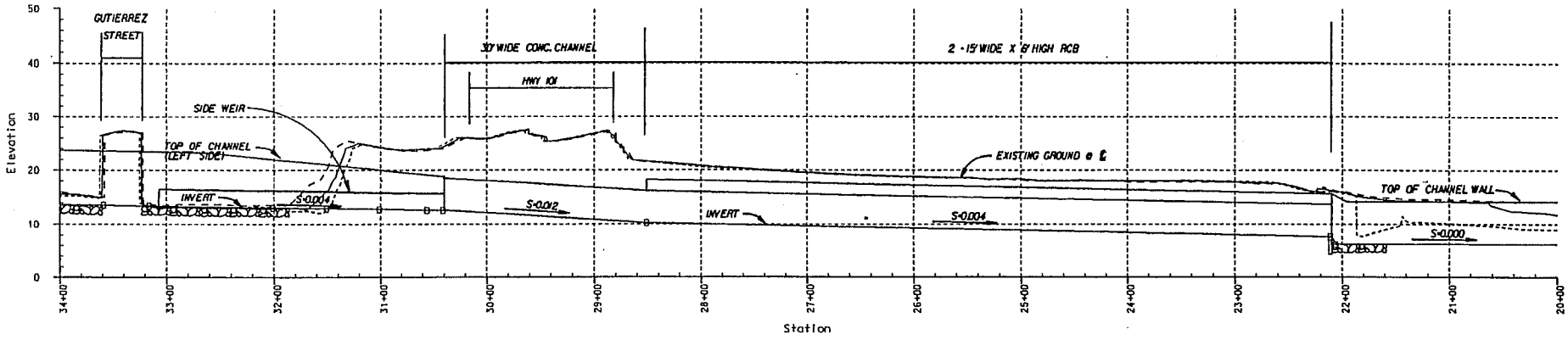
DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

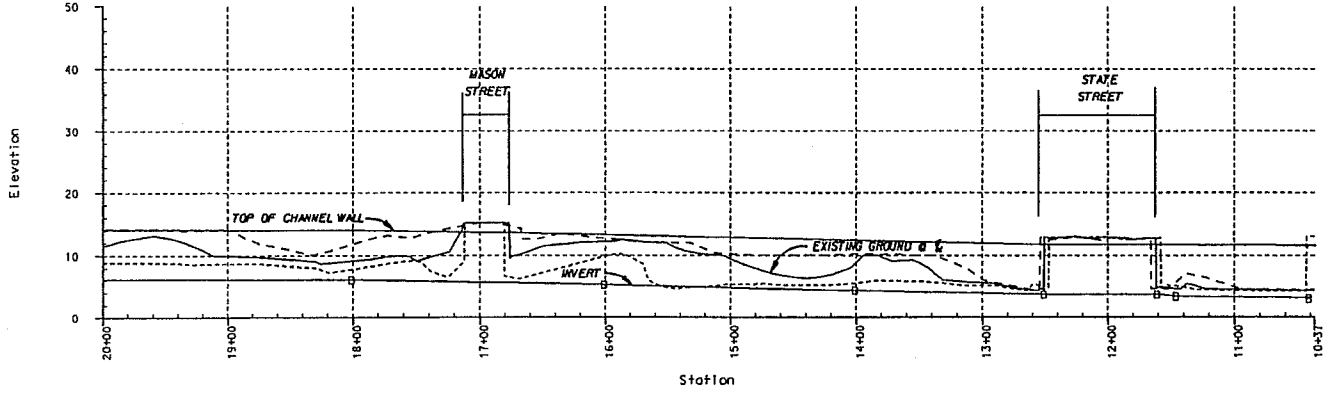
CADD FILE NAME:

DISTRICT FILE NO. 2567

SHEET 26

SAFETY PAYS





LEGEND	
LINE	GROUND OFFSET FROM CL
———	0.00
- - - -	-7.00
— — — —	7.00

20 10 0 20 40FT

SCALE: 1" = 20'

100 50 0 100 200FT

SCALE: 1" = 100'

LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
3400 CFS - RIPRAP SIDESLOPE WALL
RECOMMENDED PLAN
PROFILE

U.S. ARMY ENGINEER DISTRICT
LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: THOMAS H. SAGE, P.E.
CHIEF, DESIGN BRANCH

DESIGNED BY: RT
DRAWN BY: RT
CHECKED BY: RT

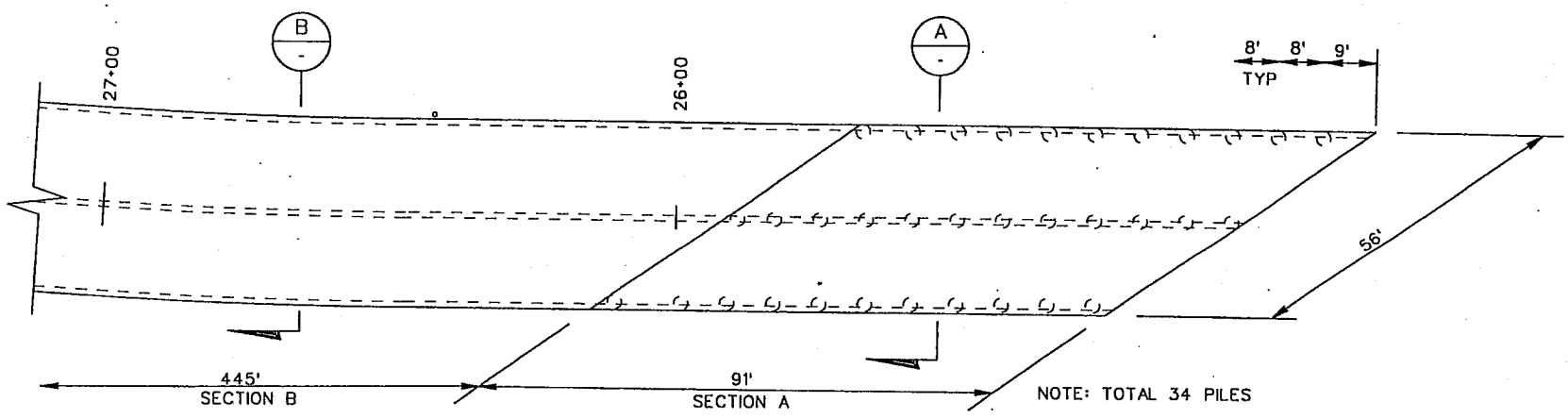
CADD FILE NAME:

DISTRICT FILE NO. 3400

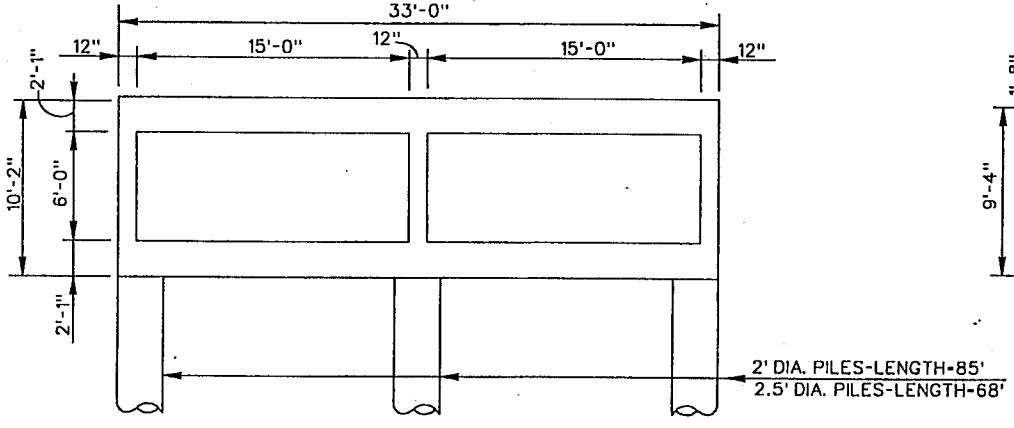
SHEET 27

SYMBOL	DESCRIPTION	DATE	APPROVAL

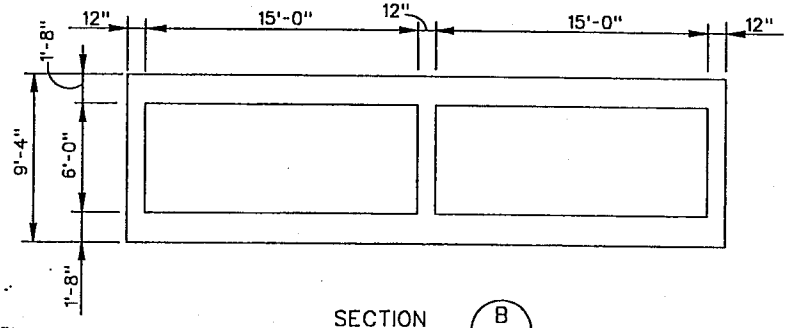
REVISIONS



BOX CULVERT PLAN
SCALE: N.T.S.



SECTION A
SCALE: N.T.S.



SECTION B
SCALE: N.T.S.

U. S. ARMY CORPS OF ENGINEERS, LOS ANGELES DISTRICT

LOWER MISSION CREEK FEASIBILITY STUDY

6' HIGH x 15' WIDE TWO-CELL BOX CULVERT

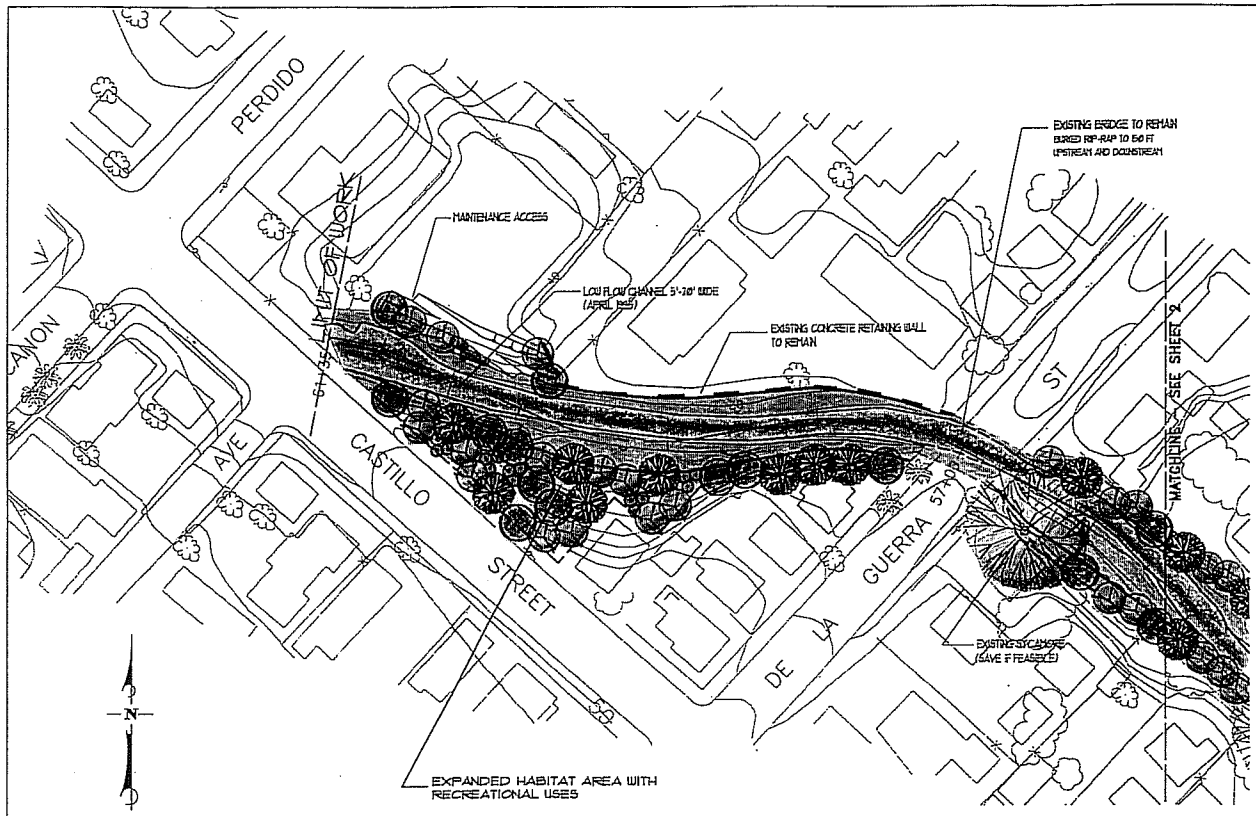
DESIGNED BY	CHECKED BY	DATE	FILE NAME
M. LY	X	FEB 28, 2000	LMC-PLAN2.DGN

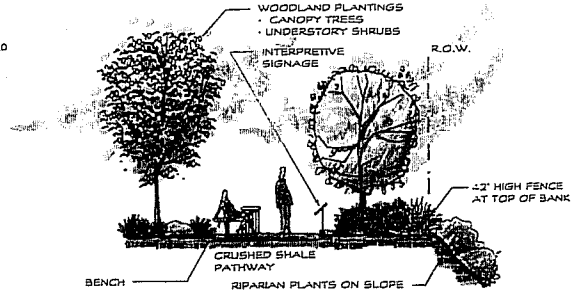
SHEET 28

Exhibit 8.

ARCHITECTURAL DRAWINGS

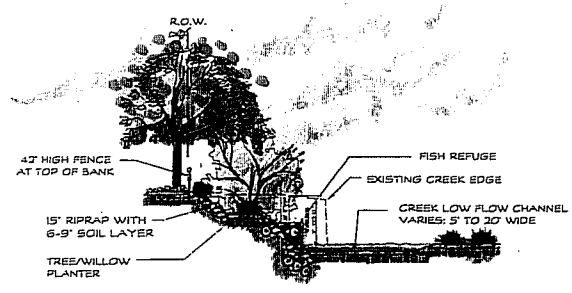
Sheets 1 - 9





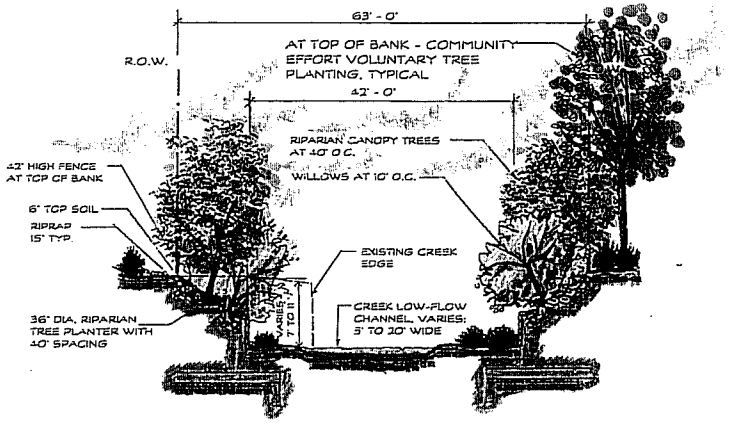
RECREATIONAL USE CONCEPT

NOT TO SCALE



EXPANDED HABITAT AREA

NOT TO SCALE



VEGETATED SIDE SLOPE
42' TYPICAL SECTION

NOT TO SCALE

SEE SHEETS 6, 7, AND 8 FOR FISH HABITAT STRUCTURES

DAVID R. BLACK & ASSOCIATES

LANDSCAPE ARCHITECTS
PLANNERS
1109 STATE ST.
SANTA BARBARA
CALIFORNIA 93101
(805) 963-9168
FAX 963-3197

Penfield & Smith
ENGINEERS • SURVEYORS
101 E. VICTORIA ST. SANTA BARBARA
(805) 963-9532 CALIF. 93101
MAILING ADDRESS: P.O. BOX 98 (93102)

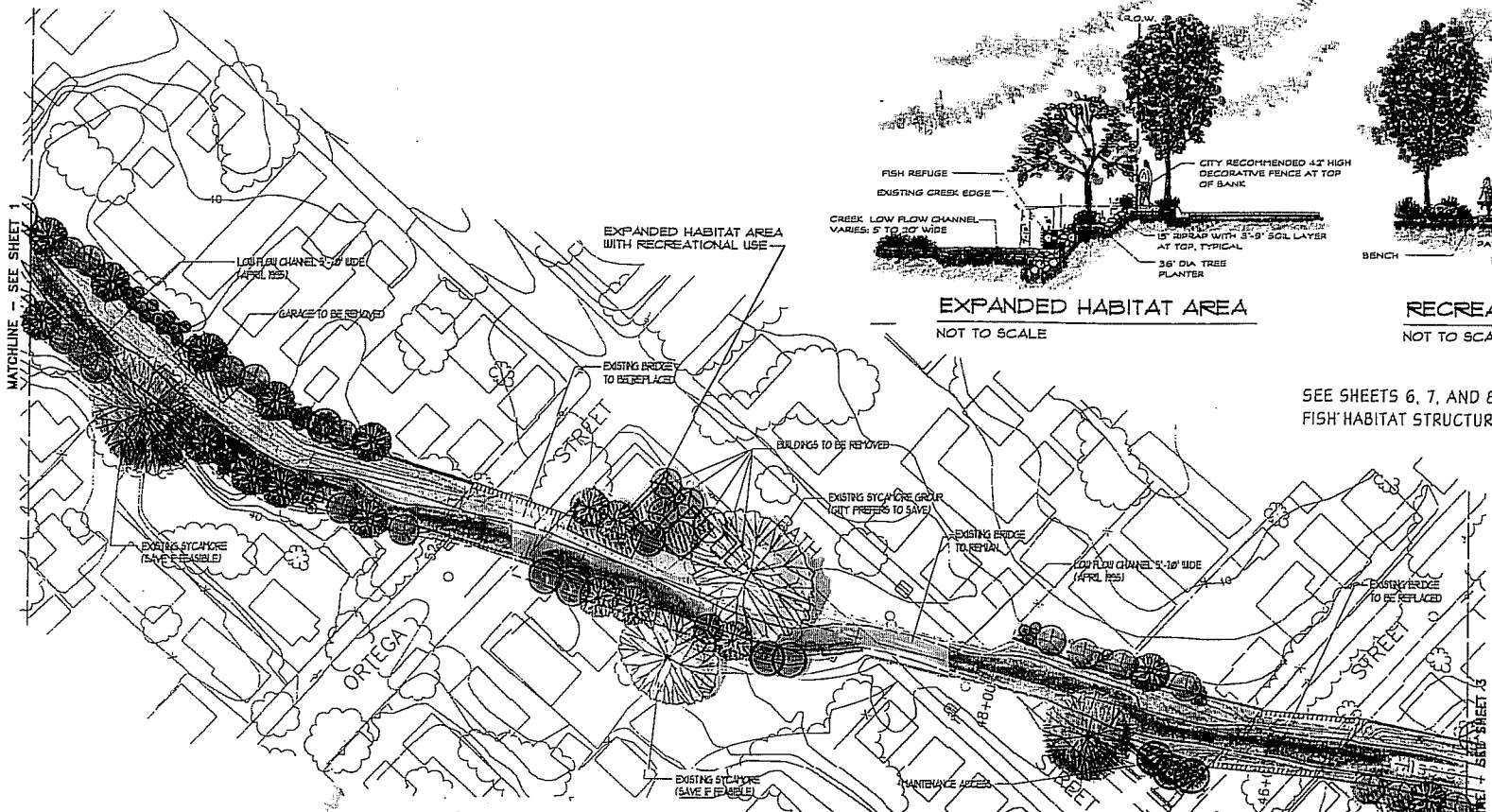
NOTE: TREE SIZES INDICATED ARE APPROXIMATELY 5 TO 7 YEARS AFTER INSTALLATION. CITY PREFERS TREES GROUPED AND NATURAL AS SHOWN.

LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA

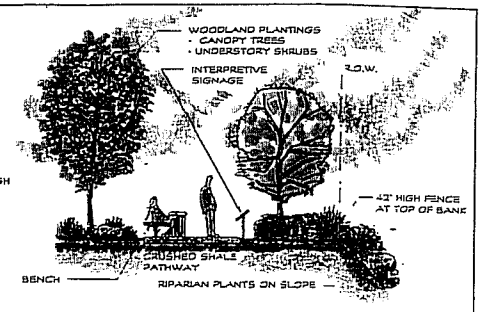
BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES



SEE SHEETS 6, 7, AND 8 FOR FISH HABITAT STRUCTURES

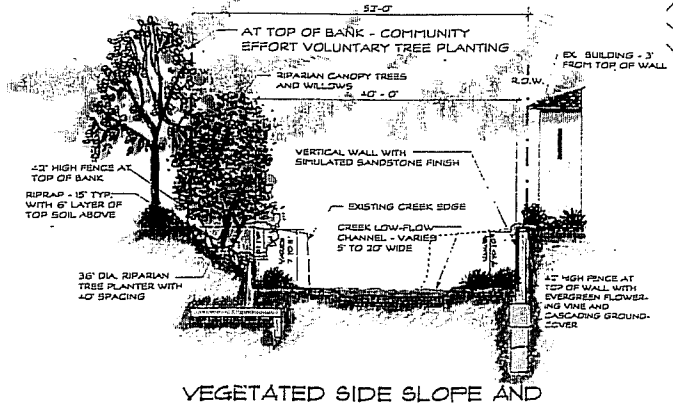
EXPANDED HABITAT AREA

NOT TO SCALE



RECREATIONAL AREA CONCEPT

NOT TO SCALE



VEGETATED SIDE SLOPE AND VERTICAL WALL SECTION VIEW

NOT TO SCALE

DAVID R. BLACK & ASSOCIATES
LANDSCAPE ARCHITECTURE
PLAN DESIGN
1103 STATE ST.
SANTA BARBARA
CALIFORNIA 93101
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FAX 963-3197

Penfield & Smith
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101 E. VICTORIA ST. SANTA BARBARA
(805) 963-9532 CALIF. 93101
MAILING ADDRESS: P.O. BOX 95 (93102)

N

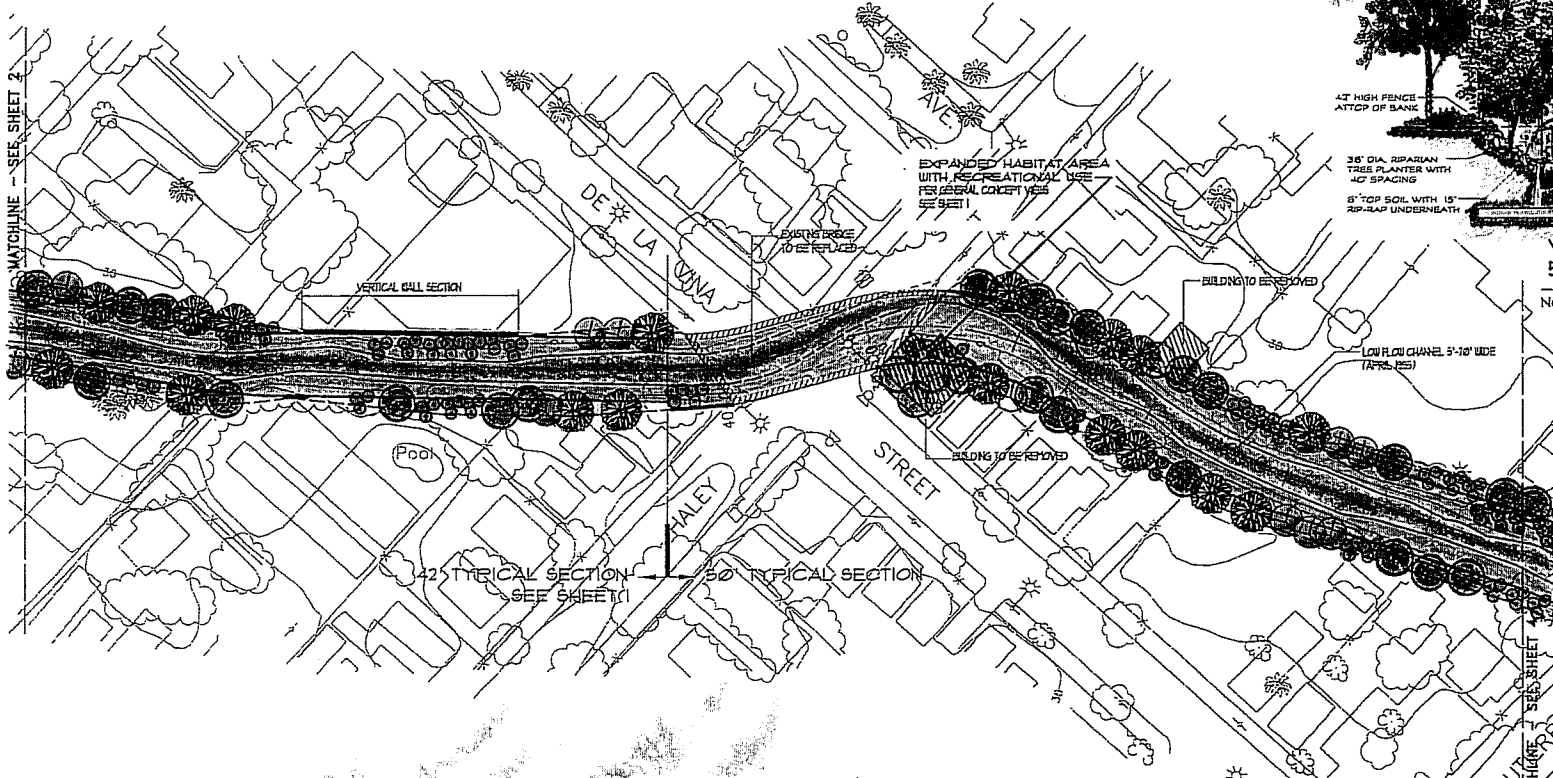
SCALE: 1"=40'
0 40 80 120

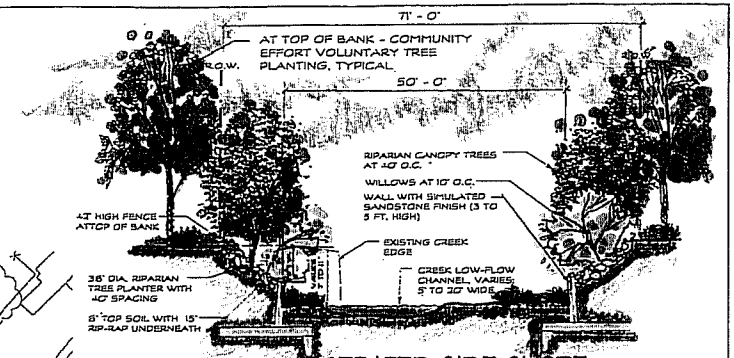
LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA

BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES

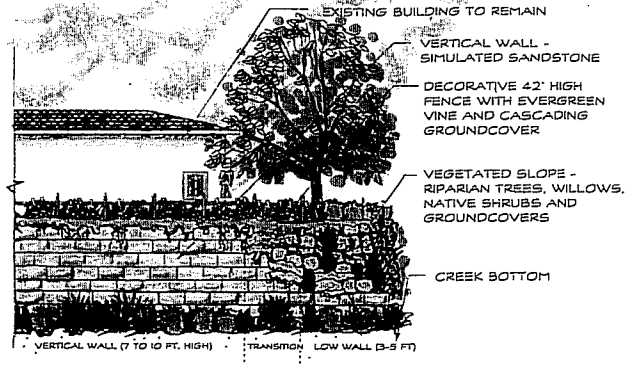




VEGETATED SIDE SLOPE
50' TYPICAL SECTION

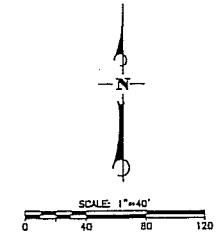
NOT TO SCALE

SEE SHEETS 6, 7, AND 8 FOR FISH HABITAT STRUCTURES



VERTICAL WALL CONCEPT

NOT TO SCALE



DAVID R. BLACK & ASSOCIATES
LANDSCAPE ARCHITECTURE
URBAN DESIGN
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SANTA BARBARA, CALIFORNIA 93101
(805) 963-3188
FAX 963-3187

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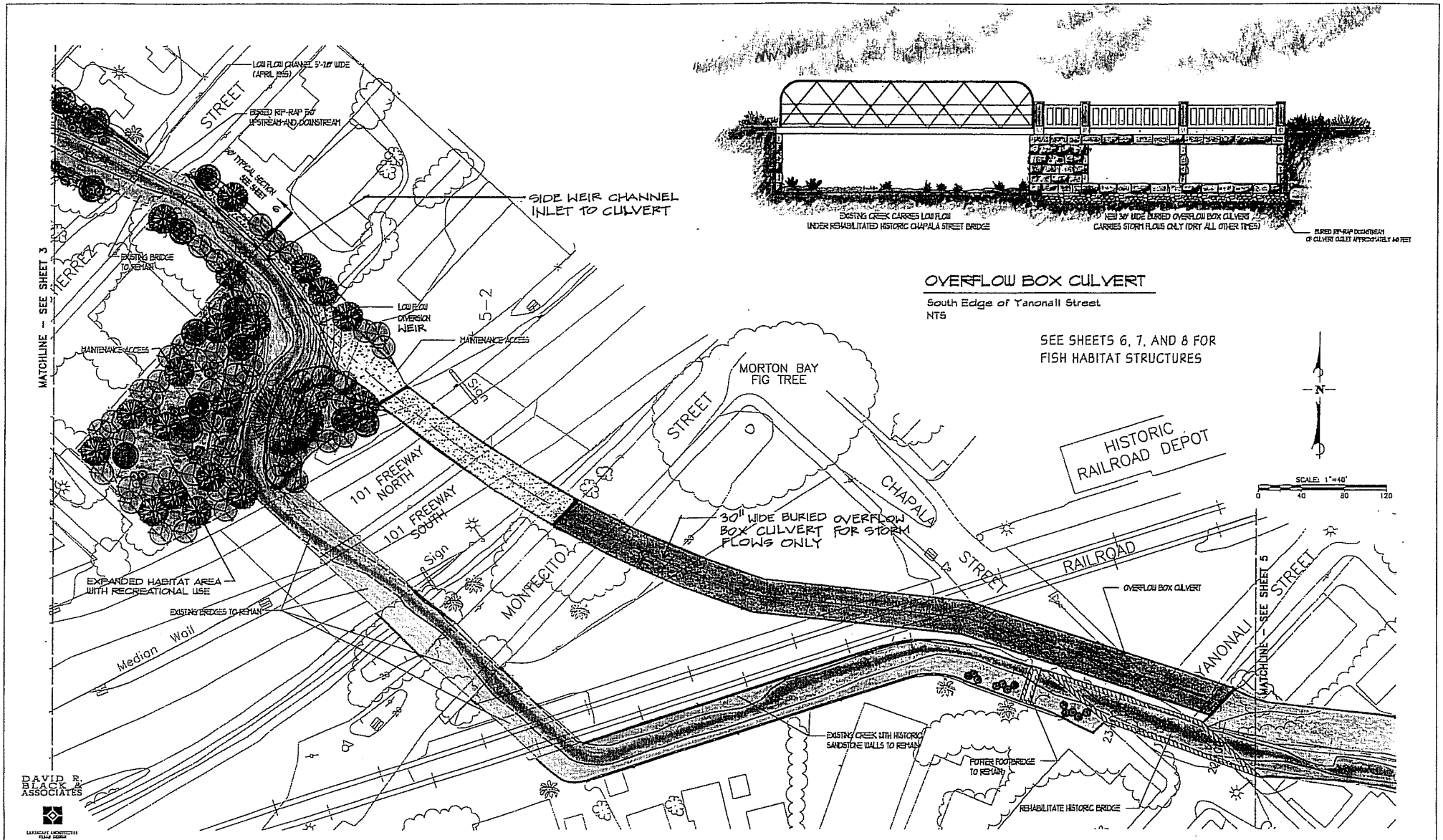
101 E. VICTORIA ST. SANTA BARBARA CALIF. 93101
(805) 963-9532
MAILING ADDRESS: P.O. BOX 98 (93102)

LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R BLACK AND ASSOCIATES



OVERFLOW BOX CULVERT

South Edge of Yanonali Street
NTS

SEE SHEETS 6, 7, AND 8 FOR FISH HABITAT STRUCTURES

DAVID R. BLACK & ASSOCIATES

LANDSCAPE ARCHITECTS
VILLA CORSA

1108 STATE ST.
SANTA BARBARA
CALIFORNIA 93101
(805) 963-3159
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Penfield & Smith
ENGINEERS + SURVEYORS
101 E. VICTORIA ST. SANTA BARBARA
(805) 963-9532 CALIF. 93101
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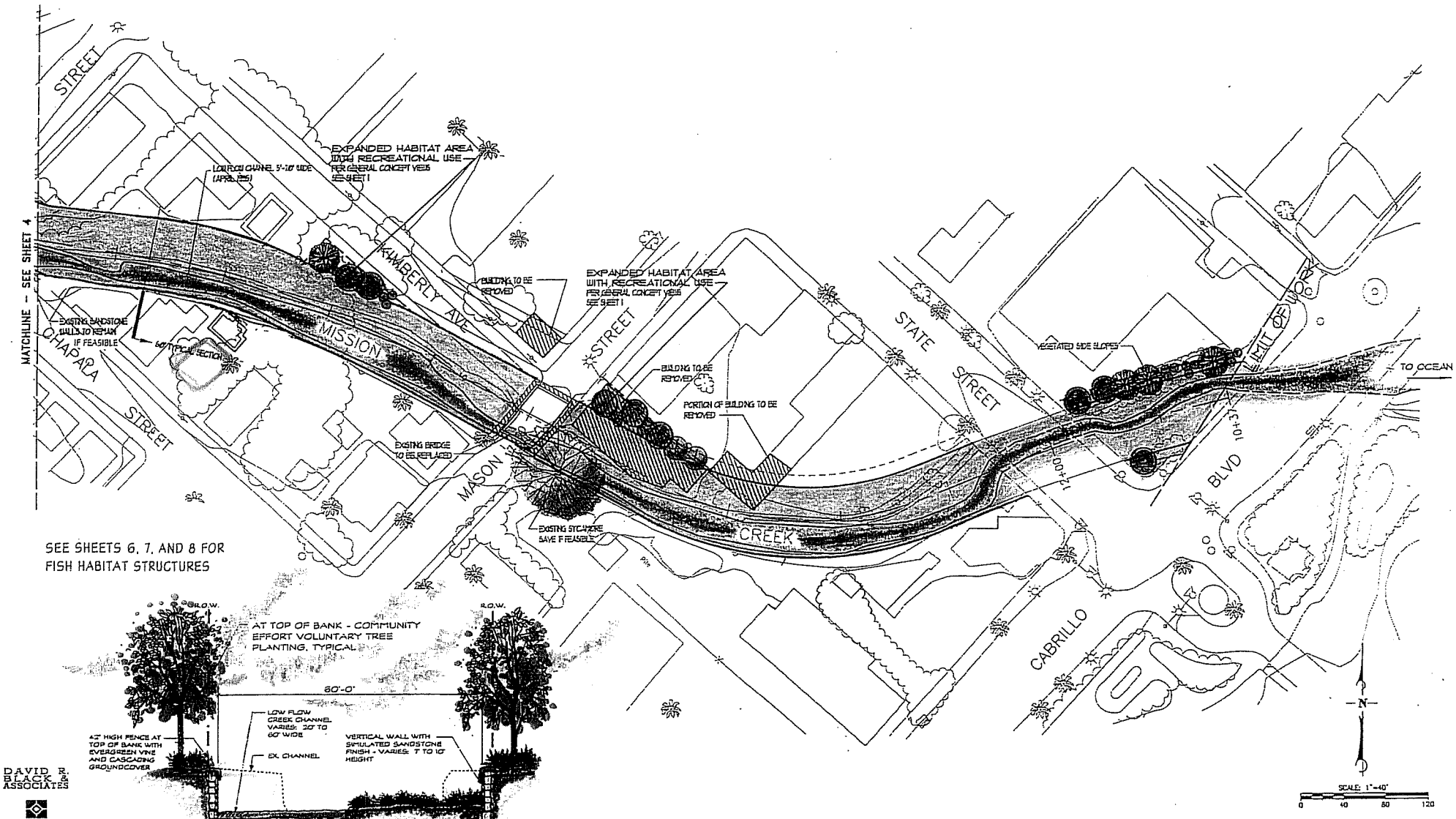
LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R BLACK AND ASSOCIATES



DAVID R. BLACK & ASSOCIATES

Penfield & Smith
ENGINEERS • SURVEYORS
101 E. VICTORIA ST. SANTA BARBARA
(805) 963-9532 CALIF. 93101
MAILING ADDRESS: P.O. BOX 98 (93102)

VERTICAL WALL ON PIER FOOTING
TYPICAL SECTION

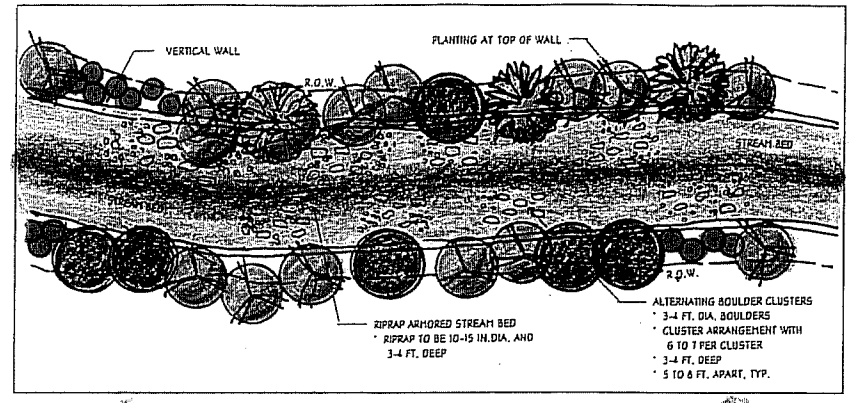
NOT TO SCALE

LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

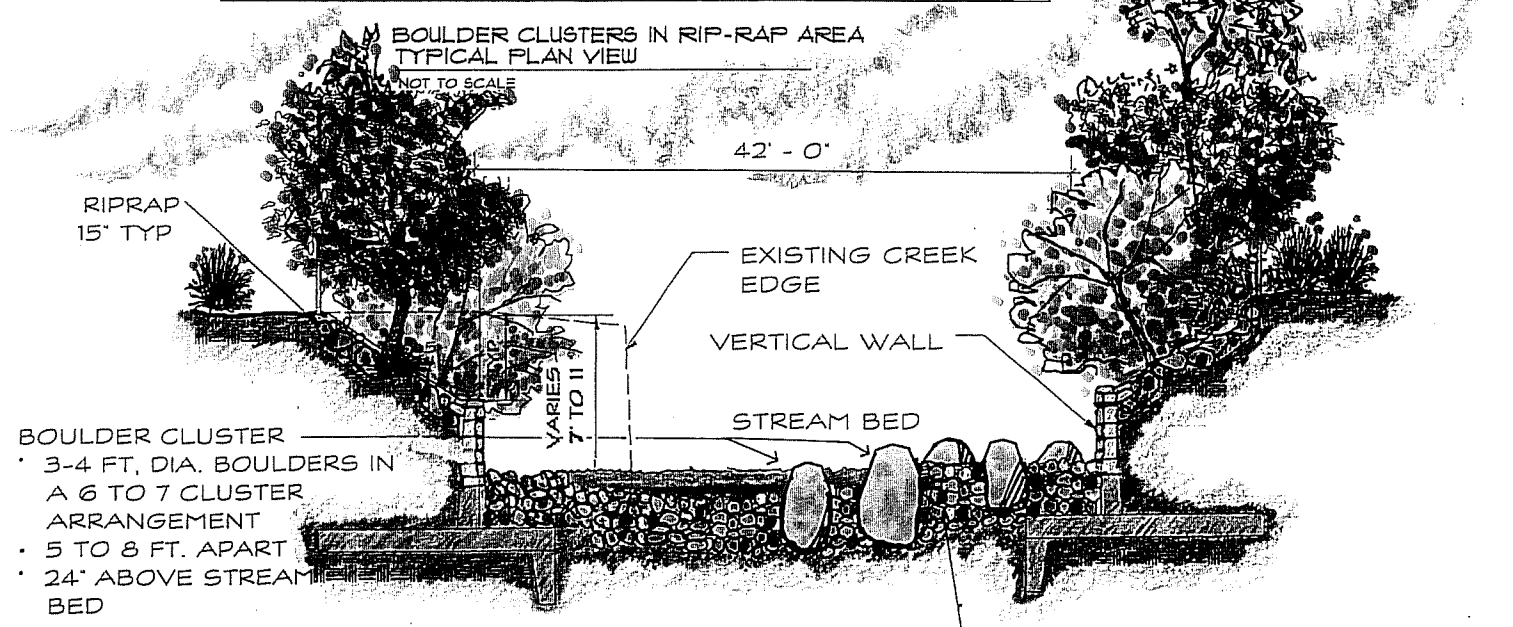
PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES

SHEET 5



BOULDER CLUSTERS IN RIP-RAP AREA
TYPICAL PLAN VIEW
NOT TO SCALE



BOULDER CLUSTERS IN RIP-RAP AREA
TYPICAL SECTION
NOT TO SCALE

DAVID R. BLACK & ASSOCIATES

LANDSCAPE ARCHITECTS
PLANNERS

1128 STATE ST.
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(805) 963-4532 CALIF. 93101
MAILING ADDRESS: P.O. BOX 98 (93102)

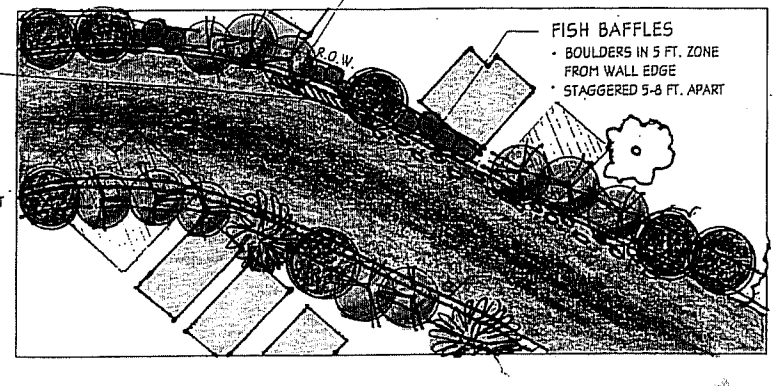
LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES

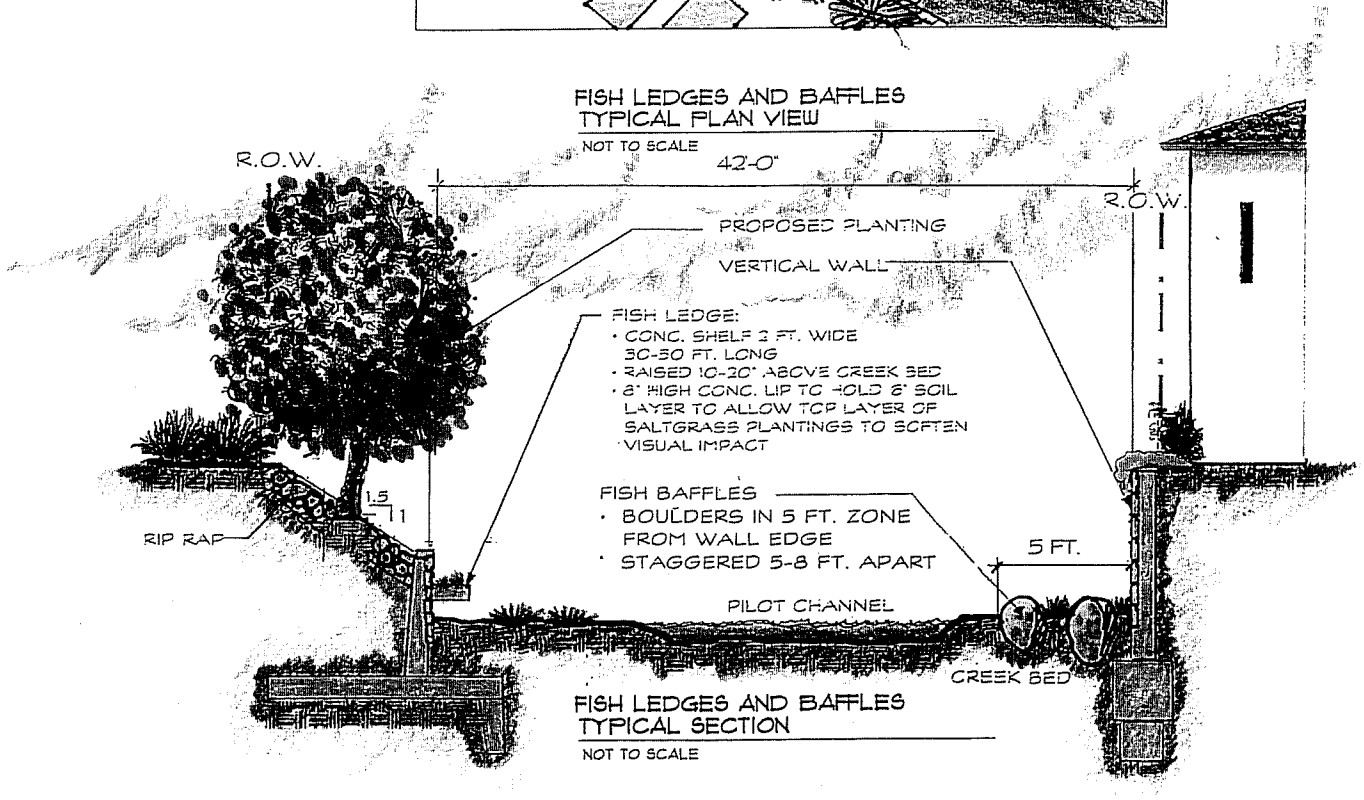
SHEET 5

FISH LEDGES
- CONCRETE SHELF 2 FT. WIDE X 30 TO 50 FT. LONG
- RAISED 10 TO 20 IN. ABOVE CREEK-BED
- 6" W. X 8" H CONCRETE LIP TO SURROUND TOP SIDE OF LEDGE TO HOLD 6" SOIL LAYER FOR SALTGRASS PLANTINGS TO SOFTEN VISUAL IMPACT
- CONCRETE LIP TO ALLOW FOR DRAINAGE



FISH BAFFLES
- BOULDERS IN 5 FT. ZONE FROM WALL EDGE
- STAGGERED 5-8 FT. APART

FISH LEDGES AND BAFFLES
TYPICAL PLAN VIEW
NOT TO SCALE



FISH LEDGES AND BAFFLES
TYPICAL SECTION
NOT TO SCALE

DAVID R. BLACK & ASSOCIATES
LANDSCAPE ARCHITECTS
TITLE 19001
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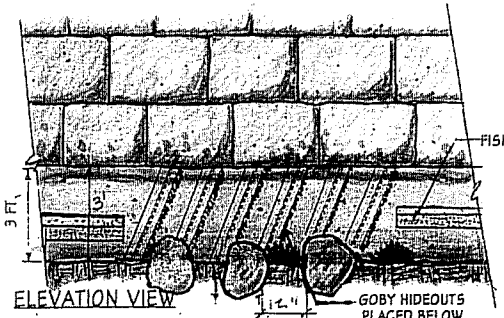
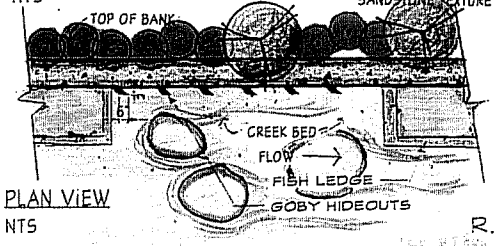
LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

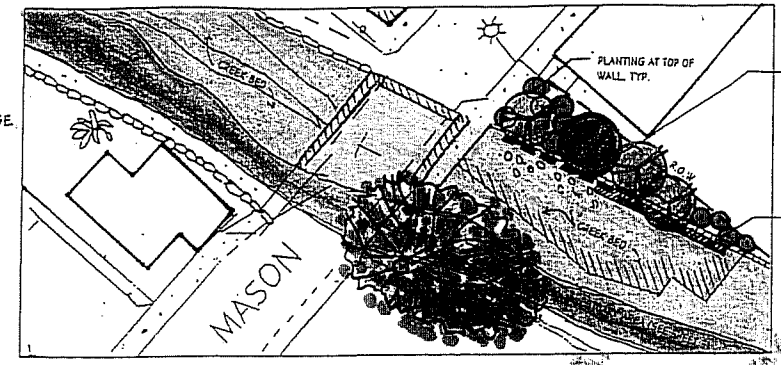
PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES



ELEVATION VIEW
NTS



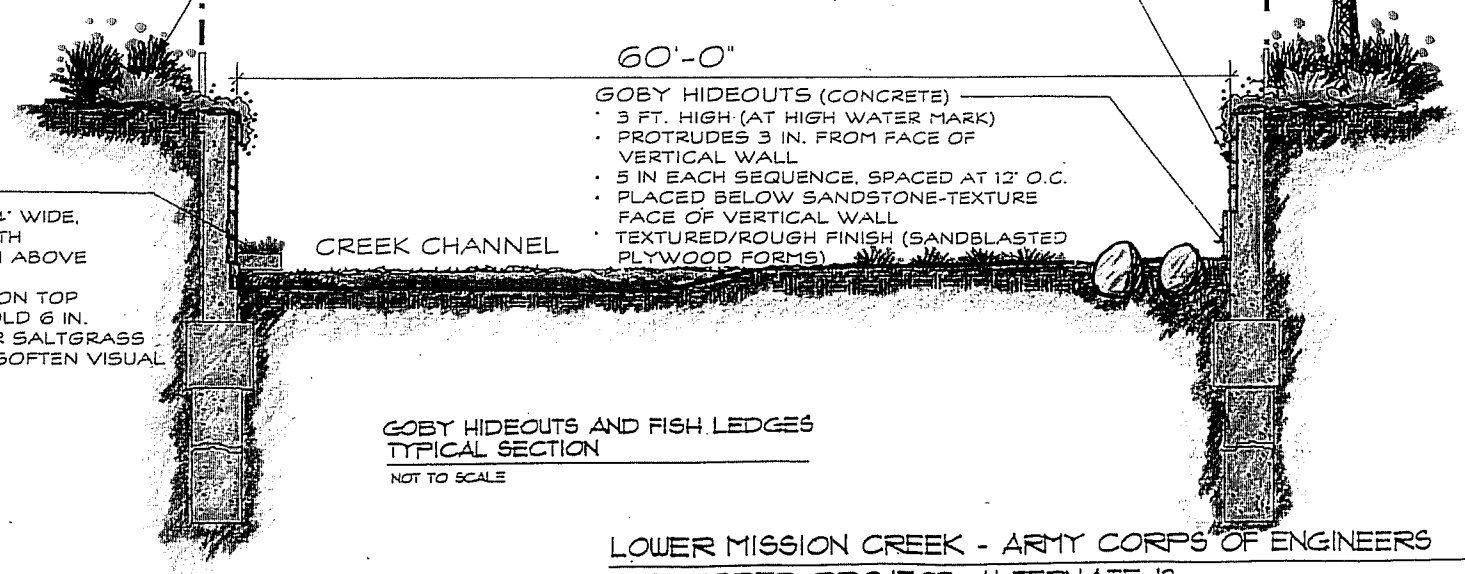
PLAN VIEW
NTS



GOBY HIDEOUTS (CONCRETE)
- 3 FT. HIGH (AT HIGH WATER MARK)
- PROTRUDES 3 IN. FROM FACE OF VERTICAL WALL
- 5 IN EACH SEQUENCE, SPACED AT 12" O.C.
- PLACED BELOW SANDSTONE-TEXTURE FACE OF VERTICAL WALL
- TEXTURED/ROUGH FINISH (SANDBLASTED PLYWOOD FORMS)

FISH LEDGE
- CONC. LEDGE 24" WIDE, 30 TO 50 LENGTH
- RAISED 10-20 IN ABOVE CREEK BED
- 6 IN. CONC. LIP ON TOP SURFACE TO HOLD 6 IN. SOIL LAYER FOR SALTGRASS PLANTINGS TO SOFTEN VISUAL IMPACT

GOBY HIDEOUTS AND FISH LEDGES
TYPICAL PLAN VIEW
NOT TO SCALE



GOBY HIDEOUTS AND FISH LEDGES
TYPICAL SECTION
NOT TO SCALE

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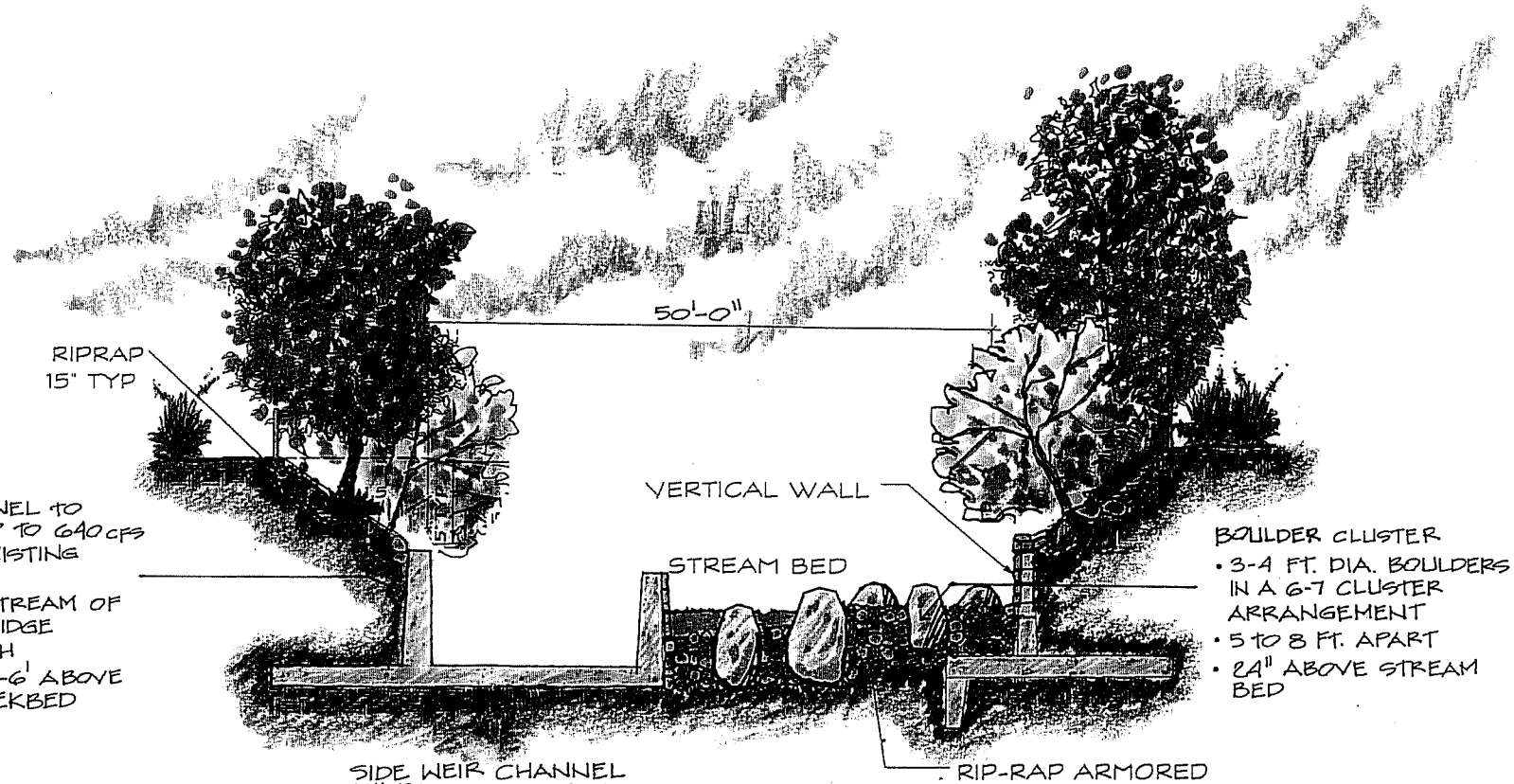
LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

PREFERRED PROJECT: ALTERNATE 12

PREPARED FOR THE CITY OF SANTA BARBARA, AND THE COUNTY OF SANTA BARBARA
BY PENFIELD AND SMITH AND DAVID R. BLACK AND ASSOCIATES



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LOWER MISSION CREEK - ARMY CORPS OF ENGINEERS

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Exhibit 9

LETTERS OF INTENT
AND
FINANCIAL CAPABILITY

COUNTY OF SANTA BARBARA
PUBLIC WORKS DEPARTMENT
123 East Anapamu Street
Santa Barbara, California 93101
805\568-3000 FAX 805\568-3019

PHILLIP M. DEMERY
Director

September 7, 2000

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
US Army Corps of Engineers, Los Angeles District
PO Box 532711
Los Angeles, CA 90053-2325

RE: Letter of Intent, Lower Mission Creek Project, Santa Barbara, CA

Dear Mr. Koplin:

The Santa Barbara County Flood Control District (District) is the local sponsor for the Lower Mission Creek Project, Santa Barbara, California. Along with our co-sponsor, the City of Santa Barbara (City), and the Corps as the federal lead agency, we are working together on completing the environmental processes (CEQA & NEPA) associated with the Project's Feasibility Report.

As the Corps is well aware, Lower Mission Creek is a serious flooding threat to portions of the City. Most recently, flooding was experienced twice in 1995 and again in 1998, with the January 10, 1995 flood being the most severe flood in recent history. In addition, the creek corridor is degraded and unsightly.

For many years the District and the City have endeavored to complete a project on lower Mission Creek. To date, local agencies have spent well over $1 million working on this flooding problem.

As you know, the maintenance element of this project has yet to be completed. Throughout the Recon and Feasibility process, the District has constantly stated that the project cannot go forward without the assurance of continued long-term maintenance. The community cannot be expected to contribute to the project costs without assurances that the benefits of the project continue into the future. We understand the Corps is in agreement with this point. As you know, the maintenance element has been fully described in the Feasibility Report / EIS/EIR.

As the local sponsor for the Project, along with the City as local co-sponsors, we recognize that the local cost share for the project could be as much as 50% of the Project costs. As the estimate currently sits at about $20 million, the local

share could be as high as $10 million. The District and the City are prepared to meet this obligation through the revenues generated by the City and the District's South Coast Flood Zone. In March of 1996, the voters of the South Coast Flood Zone elected to increase property assessments in the South Coast Flood Zone to fund several Flood Control projects in the area including the Lower Mission Creek Project.

Upon completion of the Environmental Review Process, staff will be in a position to return to the Board of Directors of the Flood Control District for final project approval and direct staff to draft the necessary cost-sharing agreements to implement the project.

The District wishes to also take this opportunity to thank the Corps for their efforts in developing a project on lower Mission Creek. The issues involved in the project are complex and interrelated. We appreciate the willingness of the Corps to work through the many issues that are important to the local community.

Should you have any questions please contact Thomas Fayram, Deputy Public Works Director at 805-568-3436.

Sincerely,

For Phillip M. Demery
Public Works Director
Santa Barbara County

CITY OF SANTA BARBARA

PUBLIC WORKS DEPARTMENT
Telephone: (805) 564-5377
Fax: (805) 564-5467
www.ci.santa-barbara.ca.us

630 Garden Street
P.O. Box 1990
Santa Barbara, CA 93102-1990

September 12, 2000

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
US Army Corps of Engineers, Los Angeles District
P.O. Box 532711
Los Angeles, CA 90053-2325

SUBJECT: LETTER OF INTENT, LOWER MISSION CREEK PROJECT, SANTA BARBARA, CA

Dear Mr. Koplin:

The City of Santa Barbara supports the Santa Barbara County Flood Control District (District) as the local sponsor for the Lower Mission Creek Project, Santa Barbara, California. We have been working together extensively with the District and the U.S. Army Corps of Engineers (Corps) on completing the environmental processes (CEQA & NEPA) associated with the Project's Feasibility Report.

As the Corps is well aware, Lower Mission Creek is a serious flooding threat to portions of the City. Most recently, flooding was experienced twice in 1995 and again in 1998, with the January 10, 1995 flood being the most severe flood in recent history. In addition, the creek corridor is degraded and unsightly.

For many years, the District and the City have endeavored to complete a project on lower Mission Creek. To date, local agencies have spent well over $1 million in support of the Corps working on a solution this flooding problem.

We support the District's statement that the project cannot go forward without the assurance of continued long-term maintenance. The community cannot be expected to contribute to the project costs without assurances that the benefits of the project continue into the future. We understand the Corps is in agreement with this point. As you know, the maintenance element has been fully described in the Feasibility Report/EIS/EIR.

Along with the District, as the local sponsor for the project, we recognize that the local cost share for the project could be as much as 50% of the Project costs. As the proposed cost is currently estimated to be about $20 million, the local share could be as high as $10 million. The District and the City are prepared to meet this obligation through the revenues generated by they City and the District's South Coast Flood Zone. In March of 1996, the voters of the South Coast Flood Zone elected to increase property assessments in the South Coast Flood Zone to fund several Flood Control projects in the area including the Lower Mission Creek Project.

Upon completion of the Environmental Review Process, staff will be in a position to return to the City Council in coordination with the District for final project approval and direct staff to draft the necessary cost-sharing agreements to implement the Project.

The City wishes to also take this opportunity to thank the Corps for their efforts in developing a project on lower Mission Creek.

Should you have any questions, please contact Pat Kelly, Assistant Public Works Director/City Engineer, at (805) 564-5366.

Sincerely,

David H. Johnson
Public Works Director

PK/pav

cc: Phil Demery, Public Works Director, Santa Barbara County, 123 E. Anapamu Street, Santa Barbara, CA 93101

APPENDIX 3

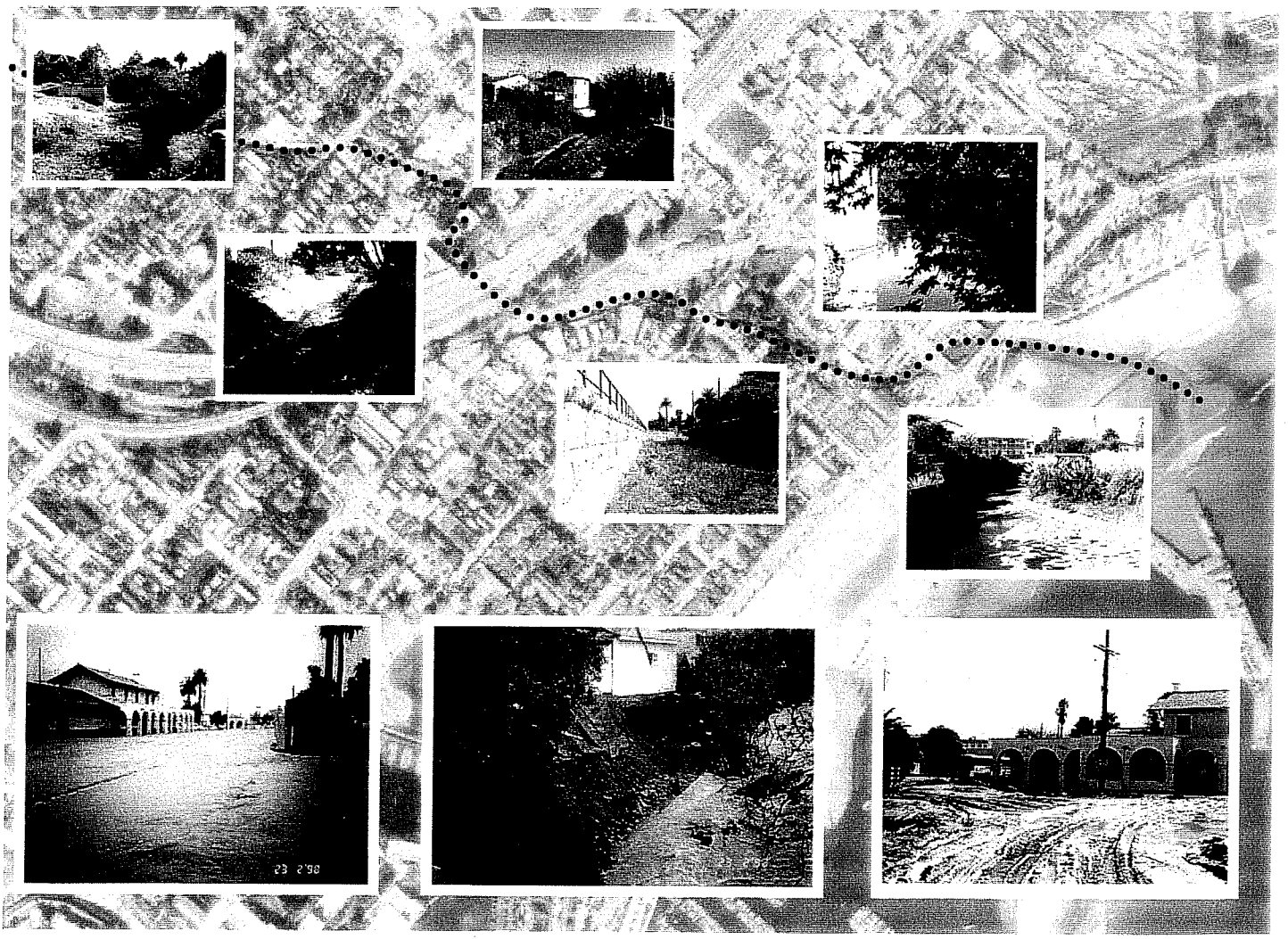
Lower Mission Creek Flood Control Feasibility Study Final EIS/EIR (USACE 2000)

US Army
Corps of Engineers
Los Angeles District
South Pacific Division

FINAL EIS/EIR , September 2000

SANTA BARBARA COUNTY STREAMS

LOWER MISSION CREEK FLOOD CONTROL FEASIBILITY STUDY



Los Angeles District, Corps of Engineers
Planning Division
P.O. Box 532711
Los Angeles, California 90053

Final
Environmental Impact Statement/Environmental Impact Report (EIS/EIR)
Proposed Plan for Flood Control
Lower Mission Creek Flood Control Project
Santa Barbara
Santa Barbara County, California

The lead Federal agency is the U.S. Army Corps of Engineers, Los Angeles District.
The responsible agencies for compliance with the California Environmental Quality Act are the Santa Barbara County Flood Control and Water Conservation District, and the City of Santa Barbara Public Works Department.

Abstract: The Feasibility Report for the Lower Mission Creek Flood Control Project resulted in the selection of a final array of alternatives to protect the city of Santa Barbara against future flooding. This EIS/EIR specifically addresses alternatives 12, 6, 8 and 1-No Action Alternative. These alternatives would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. Channel improvements would occur for approximately the last mile of the creek between the Canon Perdido Street Bridge at the upstream end, and the Cabrillo Boulevard Bridge near the outlet. Alternative 12, the National Economic Development (NED) and tentatively recommended plan, includes: natural creek bottom; replacement of four bridges, streamlining bedslope, installing a culvert that bypasses the oxbow, stabilizing creek banks using a combination of vertical walls and vegetated riprap; and construction of habitat zones and a wetland. Alternative 6 consists of: natural creek bottom; stabilized creek banks with vertical walls and vegetated stepped banks; replacement of seven bridges; streamlining bedslope; construction of habitat zones, a wetland; and the oxbow would be widened to convey higher flows. Alternative 8 consists of: natural creek bottom; stabilization of creek banks with vertical concrete walls; replacement of five bridges; streamlining bedslope, installing a culvert that bypasses the oxbow; and construction of habitat expansion zones and a wetland. Future maintenance is a integral part of the project design for all alternatives identified about, and it is included in the project description for the life of the project. Project design incorporates planting of vegetation along upper banks, within vacant land parcels, and construction of a wetland. Alternative 12 would provide maximum incidental environmental benefits, and it is an environmentally superior plan compared to other viable alternatives considered during the feasibility study. A Modified Habitat Evaluation Procedure (HEP) has been developed to identify the existing value of biological resources and evaluate impacts related to the project implementation and future maintenance. Alternative 8 would be environmentally damaging compared to alternatives 6 and 12. Mitigation measures and environmental commitments summarized in section 24 and Mitigation Monitoring Plan (Appendix H) of this EIS/EIR would be implemented to minimize impacts to biological, cultural, traffic, water quality, air quality and noise. Mitigation measures would be similar for all evaluated alternatives in the EIS/EIR.

Under the No Action Alternative, the existing channel would remain in place and periodic maintenance would be required, however the City of Santa Barbara would be subject to flooding.

THE OFFICIAL CLOSING DATE FOR THE RECEIPT OF COMMENTS IS 30 DAYS FROM THE DATE ON WHICH THE NOTICE OF AVAILABILITY OF THIS FINAL EIS APPEARS IN THE FEDERAL REGISTER.

If you would like further information on the Draft Feasibility Report or Draft EIS/EIR, please contact:
Ed Demesa, Study Manager (Feasibility Study Report)
Joy Jaiswal, Environmental Coordinator (EIS/EIR)
P.O. Box 532711- (CESPL-PD-RL)
Los Angeles, CA 90053-2325
Telephone: 213-452-3796 (Demesa) 213-452-3871 (Jaiswal)
Janice M. Hubbell, AICP, Project Planner, Santa Barbara
Telephone: (805) 564-5470

NOTE: Information, displays, and maps discussed in the Main Feasibility Study Report for a flood control project on Lower Mission Creek are incorporated by reference in this EIS/EIR.

FINAL ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT (EIS/EIR) LOWER MISSION CREEK FLOOD CONTROL PROJECT

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b. Letter to NMFS, dated June 16, 2000.
c. Letter from the National Fisheries Service, dated March 21, 2000.
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EXECUTIVE SUMMARY
LOWER MISSION CREEK FLOOD CONTROL PROJECT
ENVIRONMENTAL IMPACT STATEMENT/
ENVIRONMENTAL IMPACT REPORT
(EIS/EIR)

STUDY AUTHORITY: The Lower Mission Creek Flood Control Project is authorized under Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), which reads in parts as follows:

"*Sec. 209. The secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, ... to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the following named localities* [including]: *All Streams in Santa Barbara County, California, draining the Santa Ynez Mountains, except Santa Ynez River and tributaries.*"

PROJECT LOCATION:

The Mission Creek drainage area is located in and adjoining the City of Santa Barbara, California, about 100 miles northwest of the City of Los Angeles. The drainage area, comprising about 11.5-square miles, is a narrow coastal area and extends from the Santa Ynez Mountains on the north to the Pacific Ocean on the south. Mission Creek begins at about 4,000 feet elevation and flows about 8 miles through the City of Santa Barbara to empty into the Pacific Ocean (see Figure 1.1-1 of the EIS/EIR). The scope of this study is to evaluate potential benefits, impacts and necessary mitigation requirements associated with flood control measures within the Lower Mission Creek Area. The study is limited to the final 1.2 miles of the creek, from just downstream of Canon Perdido Street to Cabrillo Boulevard.

INTRODUCTION:

This document is written in compliance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). The lead Federal agency is the U.S. Army Corps of Engineers, Los Angeles District. The responsible agencies for compliance with the California Environmental Quality Act are the Santa Barbara County Flood Control and Water Conservation District and the City of Santa Barbara.

In the development of alternatives, extensive coordination occurred between the U.S. Army Corps of Engineers (USACOE), Santa Barbara County, the City of Santa Barbara and concerned business/property owners and environmental groups. Several public workshops and a formal public scoping meeting were conducted to obtain public views regarding the project and development of alternatives. Previously prepared engineering and environmental reports have been reviewed to identify problems and development of the alternatives. The alternatives were evaluated based on past flooding history and the need to provide flood protection to the City of

Santa Barbara. In the development of alternatives, protecting properties or reducing the flood threat to the residences and businesses located in the vicinity of Lower Mission Creek and preservation of the environment were considered.

Twelve structural Alternatives were evaluated during the Feasibility Study. These alternatives included a No Action Plan, plans with 2500 cubic feet per second (cfs) capacity with two different channel configurations, and plans with 3400 cfs capacity with nine different channel configurations. Differences in channel configuration are due to the use of the oxbow-bypass and different combinations of bank protection. Alternatives 2 and 3 would be designed to convey a flow of 2500 cfs, providing about a 15- year level of protection, and alternatives 4 through 12 would be designed to convey a flow of 3400 cfs, which would provide about a 20-year level of protection.

R In the Draft and Final EIS/EIR, eight of the twelve Alternatives were not evaluated further for environmental analysis. Based on the economic analysis performed during the feasibility study phase, four of them, Alternatives 2, 3, 5, and 9, did not meet the benefit to costs (b/c) ratio; these alternatives were not evaluated in the Draft EIS/EIR.

R During preparation of the Final EIS/EIR and revised biological assessment, extensive coordination occurred with the concerned resource agencies. (See Section 1.7.2 of the Final EIS/EIR for details on coordination). The project design and mitigation have been modified due to the resource agencies/public concerns and real estate constraints. Additional mitigation features have been added in the project design to minimize impacts to Federally listed endangered and threatened species. The economic analysis was updated to incorporate costs of the modified project design, mitigation features and real estate. Based on revised economic analysis, Alternatives 2, 3, 5, 6, 7 and 9 do not meet economic requirements.

R At request of the California Coastal Commission (CCC) and in response to public comments, the USACOE performed an informal economic analysis of two smaller versions of the Recommended Plan; both would have a conveyance capacity of 2500 cfs providing approximately 15-year level of protection. The first alternative would use the combination toe wall and riprap slope (similar to the Recommended Plan) to protect and stabilize the creek banks, and the second alternative would use riprap slope protection to stabilize the entire height of the banks. Both alternatives would apply the proposed bank protection upstream and downstream of Highway 101. Results of this informal analysis can be found in the Economic Appendix of the Main Report. Available information from the earlier 2500 cfs Alternatives found in the feasibility report, including construction costs, right-of-way costs and damage reduction benefits, were used in this analysis. The results indicate that these two alternatives would not be economically feasible.

NEED FOR THE PROJECT:

The main purpose of this project is to provide flood protection to the City of Santa Barbara. Mission Creek, especially downstream from Carrillo Street, poses a serious flood threat to the City. In this area, a mix of residential, commercial, and public properties are subject to major damages during floods. Details on flooding history are provided in the Main Report, Section II.

PLANNING OBJECTIVES:

The objective of this study is to analyze the flooding and associated problems along Lower Mission Creek, to consider alternative solutions to the flood and associated problems, and to recommend, for implementation, a solution to these problems. In development of alternatives, consideration has been given to the economic, environmental, and social needs of the study area. The Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the Nation's environment, pursuant to national environmental statutes, applicable executive orders and other Federal planning requirements. Details are provided in Section 2 of the EIS/EIR.

BACKGROUND OF DEVELOPMENT OF THE ALTERNATIVES:

Section 3 of the EIS/EIR and Section IV of the Main Report provide history of the project and plan formulation information. Twelve structural Alternatives were evaluated during the Feasibility Study. These alternatives included a No Action Plan, plans with 2500 cfs capacity with two different channel configurations, and plans with 3400 cfs capacity with nine different channel configurations. Differences in channel configuration are due to the use of the oxbow-bypass and different combinations of bank protection.

After the Alternatives Formulation Briefing, based on environmental benefits and the cost benefit ratio, a decision was made that Alternative 12 provides the most incidental environmental benefits and meets the required cost benefit ratio. The proposed alternatives were similar in nature; therefore, based on criteria, similarities and differences in the basic design features, the decision was made to evaluate four Alternatives for detailed environmental analysis in the Draft EIS/EIR. They are Alternatives 1, 6, 8, and 12. Alternative 1 continues to be the No Action plan against which the consequences of structural solutions are evaluated. The Final EIS/EIR evaluates impacts related to the same alternatives analyzed in the Draft EIS/EIR. Design features associated with these alternatives are identified in the following Table ES-1.

TABLE ES-1
COMPARISON OF DESIGN FEATURES OF ALTERNATIVES EVALUATED FOR ENVIRONMENTAL ANALYSIS

Only these Alternatives will be evaluated further. Alternative 12 has been identified as the NED (National Economic Development) and tentative preferred plan.

Design Feature	Alt. 6	Alt. 8	Alt. 12 (NED)
Conveyance capacity	3,400 ft^3/sec	3,400 ft^3/sec	3,400 ft^3/sec
Oxbow bypass	no	Yes	yes
Some vertical walls	yes	Yes	yes
Some stepped walls	yes	No	no
Some riprap slopes with native vegetation above short vertical walls	no	No	yes

R The remaining eight Alternatives were not evaluated further for environmental analysis. Since the release of the Draft EIS/EIR, the economic analysis was updated to incorporate costs of the modified project design, mitigation features and real estate. Based on revised economic analysis, Alternatives 2, 3, 5, 6, 7 and 9 do not meet economic requirements. The various design features of Alternatives 4, 6, and 7 have corresponding equivalents in Alternatives 8, 10, and 11. However, Alternative 12 also corresponds to design features of Alternatives 10 and 11. Based on those equivalencies, further environmental evaluation has not been performed for Alternatives 4, 7, 10, and 11. Plans of all alternatives except Alternative 1 are provided in the Main Report. ***The numbering of Alternatives is kept the same as the Main Report for consistency and comparison purposes. The Main Report describes all 12 Alternatives formulated during the feasibility study. Alternative 12 is the tentatively preferred alternative; therefore, it has been described first, followed by Alternatives 6 and 8.*** The project description for Alternative 12, NED/tentatively preferred plan, and brief descriptions of Alternatives 6, 8 and 1 (No Action) are provided below.

ALTERNATIVE 12 - NATIONAL ECONOMIC DEVELOPMENT (NED)/ TENTATIVELY PREFERRED PLAN - THE PROJECT DESCRIPTION:

Alternative 12 is the NED and tentatively recommended plan, which provides maximum incidental environmental benefit. This alternative is environmentally superior compared to other feasible alternatives. The project description includes features associated with the tentatively proposed alternative. Section 3.5 of the EIS/EIR provides a detailed project description.

R Alternative 12 consists of: improvements to the soft bottom channel for approximately the last mile of the creek between the Canon Perdido Street Bridge at the upstream end, and the Cabrillo Boulevard Bridge near the outlet; replacement of four bridges, streamlining bedslope, installing a culvert that bypasses the oxbow, stabilizing creek banks using vertical walls and riprap sideslope; and planting of native vegetation along the riprap; and construction of five small habitat expansion zones (See details in Section 3.5 of the EIS/EIR). This alternative would also provide the opportunity to construct another habitat expansion zone in the vicinity of the oxbow formation area. This habitat expansion zone would be located just upstream of Highway 101. This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of flood protection. The creek width would range from 60 to 70 feet at the top within the project reach. The specific width of the channel at each bridge crossing is listed in Chapter 4, Plan Formulation, of the Main Report. The average depth of the constructed creek would be 8 to 12 feet throughout the project reach. Future maintenance for the life of the project is included in this project description. Future maintenance of the constructed channel is essential to retain the form and design capacity of the creek. Impacts related to future maintenance are addressed in the EIS/EIR. Chapters 6 through 19 describe existing conditions and address impacts related to this proposed project. Environmental commitments and mitigation measures are included to avoid/reduce or minimize impacts to natural and cultural resources. A brief description of each feature is provided in the following paragraphs.

R **Removal of Existing Bank Protection and Earthen Material**:

The creek bottom and banks for about a mile, between the Canon Perdido Street and

Cabrillo Boulevard Bridges, would be excavated to increase the creek capacity to provide a 20-year level of flood protection to the City of Santa Barbara. The total amount of material to be excavated from creek banks and creek bottom would be about 82,000 cubic yards (CY). The material could be distributed to other construction sites requiring fill. All of the sandstone not used in project construction will either be conserved for use in other City projects or recycled. Most of the metal and concrete can be recycled. The green waste can be composed and recycled as compost and mulch. The USACOE will examine the suitability of the excavated materials for beach nourishment. If material is suitable, it can be used to restore sand supply on local beaches. Excavated material would be partially stockpiled in the staging areas located along the creek bank and the remaining material would be transported to disposal sites located within a radius of about 10 to 25 miles from the project site. About 17,000 to 18,000 Cubic Yards (CY) of material would be utilized in project construction as fill material. The remaining material would be disposed off at available disposal sites.

Stabilization of Creek Banks:

The existing creek banks would either be replaced with the combination short walls and riprap sideslopes or vertical walls. Lower banks would be stabilized by short vertical walls; appropriate aesthetic treatment would be applied to minimize aesthetic impacts for visible portions of the creek banks. The upper banks would be stabilized by vegetated riprap. Concrete pipes of varying sizes, would be placed vertically in between the riprap, in these pipes native or riparian type vegetation would be planted.

Oxbow Culvert:

R **Weir Inlet and Culvert that Bypasses the Oxbow:**

The oxbow is located between the Gutierrez Street and Chapala Street Bridges, where the creek makes several meandering turns. The culvert alignment would be outside the Moreton Bay Fig tree dripline to minimize impacts to its major root system. Two culverts (15-foot wide by 6-foot high boxes) connecting both ends of the oxbow are referred to as the overflow culvert or the "oxbow bypass." The overflow culvert would follow a more direct path across the oxbow. It would begin upstream of Highway 101, pass under the highway (where Caltrans had built a span to accommodate such a crossing to eliminate impacts to highway traffic), Montecito Street, and the railroad tracks before rejoining the creek alongside the downstream end of Chapala Street Bridge (See Figure 3.5.2.1-3 of the EIS/EIR).

Removal and Replacement of Bridges:

Twelve bridges span Lower Mission Creek before emptying in to the Pacific Ocean. Four of those bridges would need to be replaced including Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges. De La Vina Street Bridge will be replaced by the City prior to implementation of this project. Construction of the bridge replacements at the road crossings would need to be phased so that the adjacent road crossing could be used as a detour. Bridge reconstruction would start with the most downstream bridge (Mason State Bridge) and progress sequentially in the upstream direction ahead of the creek improvements. Detailed project descriptions of each bridge are provided in Section 3.5 of the EIS/EIR.

Habitat Expansion Zones:

Approximately five small parcels of open land would be planted with native and riparian type of vegetation. These parcels range in size between 0.03 and 0.52 acres (see figure 3.5.4 of EIS/EIR for locations). Habitat expansion zones would be designed to serve a dual purpose: to expand the corridor of riparian habitat to be planted along the stream banks and to provide passive recreational area for residents.

R The proposed project provides an opportunity for construction of an additional habitat zone in the vicinity of the oxbow formation area. This area was originally proposed as a constructed wetland. However, after further review, it was determined that this site is more suitable for use as a habitat expansion zone, as described above. However, construction of this habitat zone is subject to cleanup of the existing known contamination on the site (see details in Section 15, HTRW, of the EIS/EIR).

R **Pilot Channel:**

The project's design for the creek's invert includes scoring a "pilot channel" into the bottom as the last element of construction. Otherwise, the streambed would be a uniformly flat expanse of native sediments between the toe walls. This pilot channel would constitute a permanent component of the instream habitat between Canon Perdido and Highway 101, although one possibly given to positional shifts as the finished creek bed evolves. No pilot channel would be fashioned into the creek bed below Yanonali Street. Between Yanonali and Mason Streets, periodic tidal ebb and flow would largely negate the intended purpose of such a channel, and below Mason Street the tidal movements would very quickly would make it thoroughly ineffective.

A pilot channel large enough to carry at least 50 ft^3/sec would be adequate to carry water along the preferential innate course. Its physical size and shape would also be determined after final hydraulic analyses, but would probably be generally trapezoidal in appearance and 10 to 12 feet wide and about 1 foot deep. The channel would be enriched with representative types and gradations of the larger native substrates - coarse gravels, small cobbles, and rocks or boulders as currently exist within Mission Creek.

R **Structural Features to Mitigate and Avoid Impacts to Biological Resources:**

Several structural features would be included to avoid and mitigate impacts to biological resources. These permanent and durable mitigation features would create hiding places where fish may take refuge. They would be composed of four separate structural elements formed by coarse surface relief of the walls (goby refugia), artificial overhangs projecting from the walls (fish ledges), placing double rows of coarse boulders (fish baffles) between the overhangs along the creek walls (See Figure 3.5.2.1-18) and rock energy dissipaters. In combination, they should provide shelter for fish of all sizes. See Section 3.5 of the EIS/EIR for the detailed description of these features. Section 10 and the Biological Assessments provide purpose, implementation and mitigation provided by these features.

Duration of Construction:

Project construction, including the proposed creek improvements, oxbow culvert, and bridge replacements, is expected to take a minimum of two years to complete. During construction, excavation activities would not be carried out during heavy rain and flooding season. Every effort would be made to complete the project construction within two years. However, due to weather conditions/seasonal heavy rainfall, mechanical failure, or funding constraints, completion of the project construction could be delayed. In that case, project construction could take up to three or four years to complete. Project construction is scheduled to begin in mid-2003.

Staging / Stockpiling Areas:

The proposed staging area would be located north of Highway 101 adjacent to the channel with access off of De la Vina Street. This area could also be used for construction access. Another possible staging area would be located north of the channel between the railroad and Yanonali Street. Additional access points could be at State Street, Mason Street, Montecito Street, Cota Street, Bath Street, Ortega Street, and north of De La Guerra Street. At this staging area, the selected contractor would install a temporary trailer with the sanitary facilities. Small quantities of material excavated (about 3000 to 4000 cy) from the creekbed would be stockpiled at these local staging areas, but the majority of it would be recycled or transported to the remote stockpile/disposal site, about 20 miles from the project area.

Haul Routes:

Hauling of materials and equipment to and from the project site would primarily use Highway 101 and the three nearby on/off ramps. Carrillo Street on/off ramp is located near the upstream end of the project, while Castillo Street on/off ramp is near the lower end and provides the most direct route to the proposed staging and stockpiling sites. Access and haul routes from the staging and stockpiling sites to the specific creek construction site would use streets that are nearest to the creek, taking the most direct route. Above Highway 101, it is expected that De la Vina, Castillo, and Bath Streets would generally be the main haul routes to and from the staging area, while Castillo, Montecito, Yanonali, Mason, and State Streets would provide the main access during construction downstream of Highway 101.

R **Future Operation and Maintenance:**

Future maintenance of the creek is an integral part of the Recommended Alternative (Alternative 12). To ensure and maintain its design function and form, some activity to maintain the design capacity of the channel would be needed on a regular basis. Any areas where sediment deposition and/or vegetation growth occur beyond 15% of the channel capacity would be required to be removed to maintain the capacity of the project reach. Future maintenance would also include maintenance of the structures such as cleaning of oxbow culverts and the pilot channel, repair of vertical concrete walls and riprap (bottom riprap lining and baffle piers), structures for mitigation, and maintenance of planted vegetation (after initial establishment required as part of project construction). It is estimated that the frequency of sediment removal would be at an interval as often as once a year. However, when several low-flow years occur

sequentially, sediment removal might occur every two to three or more years. Floodflows and debris accumulation and removal would continue to impact channel vegetation and aquatic resources. Over time, pools and riffles that provide aquatic habitat would reestablish in the channel (See denials in Section 3.5 of the EIS/EIR).

Impact analysis for future maintenance is included in each resource is discussed in this EIS/EIR. Impacts related to maintenance activities are addressed in Chapters 6 through 19. Mitigation measures for future operation and maintenance for the life of the project are included in this EIS/EIR. Conditions identified in the EIS/EIR, Biological Opinions, and Mitigation Monitoring Plan would be followed during each operation and maintenance activity.

Alternative No - 1: No Action: With this alternative (future without project conditions), the existing channel and sideslope protection would remain in place. No flood protection would be provided to the residents and commercial properties located in the vicinity of the Lower Mission Creek. The No Action Alternative provides about 1,500 cfs capacity.

Alternative No. 6: 3400 cfs Flood Level Capacity Without Oxbow Bypass - Stabilized sides using predominantly vegetated stepped walls with vertical walls applied for the remaining reaches. This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained and would consist of vegetated stepped banks at a 2:1 (V: H) slope upstream of Highway 101. Downstream of Highway 101, vegetated stepped walls would be applied along the southeast bank, starting from midway between the Chapala and Mason Street Bridges to the State Street Bridge, and along the middle third of the southwest bank between Mason and State Streets. Vertical walls would be maintained for the remainder of this reach. The improved creek would generally follow the existing alignment throughout the project reach. The creek would be 50 to 70 feet wide at the top of the bank and 8 to 12 feet deep. Seven bridges along the study reach would be replaced: the Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges. The habitat expansion zones are also a project design for this alternative. Future maintenance would remain the same as identified under Alternative 12. This alternative would have all features identified under Alternative 12, except installation of culvert and stabilization of creek banks with vegetated stepped walls (see table ES-1). The remaining project description would be the same as identified under Alternative 12. It would not be as environmentally damaging as Alternative 8.

Without Oxbow Bypass:

Lower Mission Creek develops meandering course near Downtown Santa Barbara, between Yanonali and Gutierrez Streets. At this location, a oxbow has been developed. This alternative would involve stabilization of the creek banks and modification of the creek course along the oxbow, including the manmade sandstone channel. Construction along and/or within the oxbow area is called the "Without Oxbow Bypass." The location of the oxbow is shown on Figure 3.5-2 of the EIS/EIR.

Stepped Walls:

Under Alternative 6, the creek banks would be stabilized by construction of stepped walls instead of riprap. The step would allow planting of appropriate species in spaces filled with soil. These steps would be uniformly five feet wide, which would allow planting of vegetation along the creek banks. Planted shrubby native species along stepped walls would grow to an understory plant community in future.

Alternative No. 8: 3400 cfs Flood Level Capacity with Oxbow Bypass - Stabilized sides using vertical walls. This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of concrete vertical walls throughout the project reach. This alternative would incorporate a new culvert, by-passing the oxbow between just upstream of Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing alignment except at the oxbow which would be left in place to function as a low flow channel. The creek would be 44 to 60 feet wide at the top of the bank, except between the State Street and Cabrillo Boulevard Bridges where it would be 60 to 70 feet wide. The average depth of the creek would be between 8 and 12 feet. Culverts would be installed in an open space near the Moreton Bay Fig Tree, between Gutierrez and Yanonali Streets. Installation of culverts outside of the creek bed is called "With Oxbow Bypass" (see figure 3.5.2 of the EIS/EIR). Five bridges along the study reach would be replaced: the Ortega Street, Cota Street, De la Vina Street, Chapala Street, and Mason Street Bridges. The project features for this alternative are similar to Alternative 12, except the sideslopes would be stabilized by vertical concrete walls instead of a combination of short-vertical walls and vegetated riprap. Habitat expansion zones are part of this alternative design. This alternative would result in significant impacts on aesthetics and recreational resources. This alternative would not provide environmental benefits which would be provided by Alternatives 12 and 6. Please refer to the text of Alternative 12 for a detailed project description.

PUBLIC PARTICIPATION:

Public participation is important in the environmental analysis for providing assistance in defining the scope of analysis in the EIS/EIR; identifying significant environmental issues and project related impacts. Participation of affected Federal, State, and local resource agencies, Native American groups and concerned interest groups/individuals is encouraged in the scoping process. Public participation is initiated by providing the Notice of Intent and Notice of Preparation of the EIS/EIR. Prior to initiation of the EIS/EIR, a public workshop was conducted on August 28, 1997 at the City of Santa Barbara. The purpose of the workshop was to provide an update on the progress of the Lower Mission Creek Feasibility Study to the Santa Barbara area public and provide an opportunity to the residents to discuss their concerns about flooding, the environment, potential solutions, and issues related to the project.

On October 29, 1998, the Los Angeles District, U.S. Army Corps of Engineers, and the City of Santa Barbara Planning Commission hosted a public scoping meeting at the Santa Barbara, City Council Chambers to obtain agency and community views and concerns. The concerns expressed at the meeting included the need to consider a variety of alternatives; the need to address biological resources including such sensitive species as steelhead and the

California red legged frog; the need to consider potential impacts to air quality, water quality, aesthetics, safety, and cultural resources; and the need to comply with both the National Environmental Policy Act and the California Environmental Quality Act. All of these concerns have been addressed during project planning and preparation of the EIS/EIR. Comment letters received from the public during scoping process are located in Appendix I of the EIS/EIR. Concerns identified by the public on August 28, 1997, were similar to the concerns raised at the public scoping meeting for the EIS/EIR. See details in Section 2 of the EIS/EIR.

R **Public Review of Draft EIS/EIR**:

The Draft EIS/EIR was provided for public review in December 1999. The Corps of Engineers filed copies of the EIS/EIR with the EPA on December 15, 1999. The Notice of Availability (NOA) of the Draft EIS/EIR was published in the Federal Register on December 23, 1999. Copies of the Draft EIS/EIR were provided to California State Clearing House (SCH# 1998101061) for agency distribution in compliance with CEQA. The City of Santa Barbara published the NOA of the Draft EIS/EIR and public hearing in the local Newspaper and distributed the NOA to property owners, tenants, agencies and other interested parties. The Draft EIS/EIR was distributed to agencies and the public for 45-days public review (December 23, 1999 to February 7, 2000). Copies of the Draft EIS/EIR were made available at the public library for the public who wished to review it. The public hearing was conducted on January 19, 2000, at City Hall, City Council Chambers, Santa Barbara at 6:30 P.M. to solicit the public's concerns on the Draft EIS/EIR. The public was informed by mailing notices and publishing a notice in the local newspaper (see Appendix I-1, for correspondence). A summary of the public comments received during the public hearing is included in the Appendix I-2 of the EIS/EIR. Comment letters received on the Draft EIS/EIR and responses are located in the Appendix K. In accordance with NEPA (Section 1503.4(b) and CEQA (Section 15088), the USACOE, Santa Barbara County and the City of Santa Barbara reviewed the comment letters; appropriate responses are provided in Appendix K of the EIS/EIR. The text in the EIS/EIR has been revised to reflect public comments/responses. The revised text is marked with letter "**R**" in the left margin. The project description/mitigation measures have been modified in response to some the agencies/public comments. The following subsection summarizes public comments and brief responses. A list of the comment letters is provided below.

Comments Received on the Draft EIS/EIR:

1. United States Environmental Protection Agency
2. United States Department of the Interior
3. United States Coast Guard
4. California Governor's Office of Planning and Research, Clearinghouse
5. City of Santa Barbara Historic Landmarks Commission
6. City of Santa Barbara Architectural Board of Review
7. City of Santa Barbara Parks and Recreation Commission
8. City of Santa Barbara Parks and Recreation Department
9. Justin Ruhge, Concerned Taxpayers of Santa Barbara County
10. Robert Bernstein, Santa Barbara Bicycle Coalition
11. Edward Cella, President, De la Guerra Homeowners Association
12. Darlene Chirman, President, and Kendy Radasky, Santa Barbara Audubon Society
13. Richard A. Stromme, Railroad Advocates
14. Louise Boucher, Citizens Planning Association of Santa Barbara County
15. Eddie Harris, Urban Creeks Council
16. Maria Gordon, Small Wilderness Area Preservation
17. Brian Trautwein, Environmental Defense Center
18. Gabrielle and Jerome Boucher (letter #1)
19. Lisa Ann Kelly and Family
20. David Dates
21. Gail Pearce O'Brien
22. Jerome and Gabrielle Boucher (letter #2)
23. Eva Inbar
24. Dennis Hoey
25. Eduardo and Marite Gonzalez
26. Peter Gerlach
27. Antonio R. Romasanta, Harbor View Inn
28. Elihu M. Gevirtz
29. Lisa Torres
30. David Shelton and Alexandra C. Cole
31. Rita Gronhovd
32. Jana Zimmer
33. Kate Lundy
34. Teddy Gasser and Carlin Moyer
35. Charles I. Kline
36. Martin Landsfeld
37. J. D. Dale
38. John Poucher, Hollister and Brace, for Jacques Partners
39. F. Zambelli

R **<u>Summary of the Public Hearing and Brief Responses to Comments</u>:**

The U.S. Army Corps of Engineers (Corps), the Santa Barbara County Flood Control District (Flood Control District), and the City of Santa Barbara (City) held a public meeting on Wednesday evening, January 19, 2000, 6:30 PM, to give the public an opportunity to comment orally on the Draft Feasibility Study and Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The public meeting was held in the Council Chambers at Santa Barbara City Hall located at De la Guerra Plaza. A verbatim transcript of the public meeting

proceedings from a videotape was prepared; the transcript is on file at USACOE, Los Angeles District Office. Comments, and concerns raised at the public meeting and responses are provided in Section 2.5 of the Final EIS/EIR.

COMPARATIVE IMPACTS OF ALTERNATIVES:

Table 3.6-1 of the EIS/EIR provides comparative impact analysis of the alternatives evaluated for the proposed project. Alternative 12 would provide maximum incidental environmental benefits, and it is an environmentally superior plan compared to the other viable alternatives considered during the feasibility study.

RELATIONSHIP TO ENVIRONMENTAL PROTECTION STATUTES AND OTHER ENVIRONMENTAL REQUIREMENTS:

The proposed project is designed in compliance with environmental laws, Executive Orders, and other policies. Detailed descriptions and applicability of each regulation is provided in detail in Section 1 of the EIS/EIR. A list of these laws and regulations is provided below.

FEDERAL:

National Environmental Policy Act of 1969 (Public Law 91-190) as amended.
Department of Army, Regulation 200-1 (AR 200-1)
Department of Army, Regulation 200-2 (AR 200-2).
ER-200-2-2, 33 CFR 230, March 1988.
ER-1105-2-100 Regulation December 1990
Clean Water Act of 1977 (Public Law 95-217).
Endangered Species Act of 1973 (Public Law 93-205), as amended
Fish and Wildlife Coordination Act of 1958 (Public Law 85-624).
Migratory Bird Treaty Act, as amended (16 USC 703-711)
Executive Order 11988, Floodplain Management, May 24, 1977.
Executive Order 11990, Protection of Wetlands, May 24, 1977.
National Historic Preservation Act of 1966 (Public Law 89-665 as amended December 12, 1980).
Clean Air Act (Public Law 91-604), as amended.
Executive Order 12898, Environmental Justice.
Farmland Protection Policy Act, December 22, 1981 (Public Law 97-98).
Federal Water Project Recreation Act (Public Law 89-72), July 9, 1965.
Wild and Scenic Rivers Act (Public Law 90-542, as amended through Public Law 96-580, December 23, 1980).
Executive Order 13045, "Environmental Health and Safety Risks to Children" (62 Fed. Reg. 1988s (1997)).
Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC § 4601 (1996)).
Coastal Zone Management Act (Public Law 92-583).

STATE:

California Environmental Quality Act (CEQA) (Public Resources Code §§22,000 et seq.).
California Coastal Act of 1976, as amended.
California Endangered Species Act (Cal. Fish and Game Code §§ 2050-2116).
Streambed Alteration Agreement (Cal. Fish and Game Code, § 1600).
Surface Mining and Reclamation Act of 1975 (SMARA) (Cal. Pub. Res. Code § 2710).

LOCAL:

The City of Santa Barbara General Plan and Local Coastal Plan Goals and Policies

R **COORDINATION WITH THE RESOURCE AGENCIES**:

Formal and informal coordination has been conducted with concerned resource agencies. The U.S. Fish and Wildlife Service (USFWS), National Marine Fishery Service (NMFS), Corps Regulatory Branch and California Department of Fish and Game (CDFG) have participated in the planning process. During preparation of the Final EIS/EIR, extensive coordination occurred with the concerned resources agencies, these agencies are: USFWS, NMFS, California Coastal Commission (CCC), CDFG and Corps Regulatory Branch. The USACOE developed additional mitigation measures to minimize impacts to the biological resources. Concerns of the resource agencies have been addressed to the maximum extent possible. A summary of coordination is provided in Section 1 of the EIS/EIR. A list of agencies contacted is provided below.

U.S. Fish & Wildlife Service (USFWS)
National Marine Fisheries Service (NMFS)
U.S. Army Corps of Engineers Regulatory Branch
California Regional Water Quality Control Board (CRWQCB)
California Department of Fish and Game (CDFG)
California Coastal Commission (CCC)
State Historic Preservation Officer (SHPO)
Santa Barbara County Air Pollution Control District

R In addition to the resource agencies, the USACOE and the City of Santa Barbara coordinated with the Environmental Defense Center (EDC), Urban Creek Council and Audubon Society staff. The USACOE and the City of Santa Barbara met with these concerned groups to provide a status of the project and updated mitigation measures (see detail in Section 1 of the EIS/EIR).

R **MAJOR CONCLUSIONS AND FINDINGS**:

The environmental effects of the proposed array of alternatives presented in the Main Feasibility Report and in the EIS/EIR, the Affected environment and impact analysis by each resource have been discussed in detailed in sections 6 through 19 of the EIS/EIR. Alternative 1, the No Action/No Project Alternative, represents the future without project condition. Alternative 12 is the National Economic Development (NED) and tentative recommended plan. Increasing environmental benefit opportunity is feasible with alternatives consisting of

stabilization of sideslopes with a combination of vertical walls and stepped walls or combination of vertical walls and riprap. During plan formulation study, twelve alternatives were formulated to provide flood protection to the city of Santa Barbara. Alternative 12 provides maximum opportunity for providing incidental environmental benefit by planting of native riparian vegetation, compared to all other viable alternatives. The EIS/EIR also includes impacts and mitigation measures related to the future maintenance activities. Mitigation measures are summarized in Section 24 and the Mitigation Monitoring Plan in the EIS/EIR. Since the release of the Draft EIS/EIR, the project design has been modified, extensive coordination occurred with the concerned resource agencies. The USACOE developed additional mitigation measures to minimize impacts to the biological resources. With the re-alignment of the project design, impacts to the cultural resources have been minimized. Coordination with the State Historical Preservation Officer (SHPO) under NHPA Section 106has been completed.

This EIS/EIR includes, as appropriate, consideration of impacts of initial construction and future periodic debris removal; cumulative impacts of the proposed action on the environment when added to reasonably foreseeable future actions/projects in the area; a summary of mitigation measures and environmental commitments; the relationship between short-term uses of man's environment and maintenance and enhancement of long-term productivity; and any irreversible or irretrievable commitment of resources which would be involved in the proposal should it be implemented. All of the alternatives, including Alternative 1, the No Action/No Project (future without project conditions) alternative, are discussed in chapters 6 through 19. Because none of the alternatives would have a detectable impact on local or regional climatic conditions, climate is discussed in this analysis only in the context of air quality impacts. All environmental resources, the existing condition and impacts related to each resource, are described in sections 6 through 19. Section 24 of the EIS/EIR summarizes project related mitigation measures/environmental commitments to minimize project related impacts. A survey of each resource was performed. After evaluation of each resource located within the project area, it was determined the project area does contain two significant resources, biological and cultural resources. Therefore, only these two resources have been discussed briefly in the following paragraphs.

R **Biological Resources:**

Two species of fish, both listed as Federally endangered, under the Endangered Species Act, utilize Mission Creek. The tidewater goby (*Eucyclogobius newberryi*) enters the creek from the coastal lagoon and forages as far upstream as the Yanonali Street Bridge. Tidewater gobies are normally present in the area from late spring through fall.

The second species, steelhead (*Oncorhynchus mykiss*), use the lower end of Mission Creek as a migratory channel when flow conditions permit. Adults could swim upstream after steady winter rains have raised runoff rates. The species evidently spawns successfully in some years in the upper reaches of the watershed. Juvenile steelhead would use Mission Creek through the project area only as a migratory corridor to the ocean. Lower Mission Creek, the area within the project area, does not afford rearing conditions or suitable spawning conditions for steelhead.

Isolated native trees of notable age still occur at various locations along the creek. Of these, six are western sycamores (*Platanus racemosa*) and one is a coast live oak (*Quercus*

agrifolia). Elsewhere along the creek, a young cottonwood (*Populus fremontii*) struggles to survive against the effects of periodic channel maintenance, and a few mature willows (*Salix lasiolepis*) and fewer still white alders (*Alnus rhombifolia*) have become established on the overbank.

The Moreton Bay Fig (*Ficus macrophylla*) is located east of Mission Creek, at an elevation about 7 feet higher than the channel.

The USACOE has revised a modified Habitat Evaluation Procedure (HEP) to evaluate project related loss of habitat during the preparation of the Final EIS/EIR. Calculations of the HEP analysis revealed that the implementation of the proposed/preferred Alternative will yield greater habitat quality and values compared with existing conditions. In HEP analysis, loss due to project construction and future maintenance has been included for the life of the project. Conclusions of that HEP have been discussed at length with the USFWS. The HEP analysis is located in Appendix C of the EIS/EIR. The USFWS has provided a Final Coordination Act Report for the implementation of the project, which is located in Appendix B of the EIS/EIR.

A Mitigation Monitoring plan is included in Appendix H.

R The preferred plan for bank stabilization, a riprap slope extending to the bank top from low channel walls, would allow planting of a narrow but viable corridor of native riparian vegetation. A canopy consisting of several species of native trees and an understory layer consisting of willows and other native perennial species would be planted. Overall, habitat restoration of Lower Mission Creek would restore a significant wildlife corridor to this coastal stream.

R Removal of concrete surfaces from many places along the creek and restoration of a natural bottom would enhance aquatic habitats along the creek. Placement of large boulders for the purpose of dissipating stream flow energy would also promote stream conditions favorable to all fish and benthic organisms. Expansion of the creek channel below Yanonali Street would increase the habitat available to tidewater gobies. Various structural adaptations of the walls would mitigate for unavoidable, but not significant effects on gobies and steelhead. These features and future maintenance techniques which have been developed, would yield an important measure of incidental ecological benefit.

R Construction of flood control structures along Mission Creek would cause significant, temporary impacts to the stream's bottom, and thereby to the low-quality aquatic habitat which exists along the channel. Similarly, significant and temporary impacts would occur to coarse, weedy vegetation along the banks. Solitary, stately native trees would be removed in two locations to accomplish construction.

Direct impacts to gobies would be minimized by slowly de-watering half the channel at a time to allow construction in dry conditions. This plan would entail enclosing half of channel at its lower end with sheet piling, then trapping as many fish as possible and removing them to the other side of the piling. The process would be repeated for the other half of the channel. Impacts to steelhead would be avoided, or minimized, by scheduling construction in the channel and along the banks during the summer and fall months, when steelhead would not normally be present.

Various mitigation measures have been included in the project design to minimize impacts to steelhead. The NMFS has provided a Final Biological Opinion on the tidewater goby for the proposed project (Appendix B-1 of the Final EIS/EIR). Conditions/mitigation measures identified in the Biological Opinion would be followed during project construction and future maintenance. The USACOE would continuously coordinate the project design with the NMFS during development of the final project design. The USFWS Biological Opinion for the steelhead has not yet been submitted. However, the Coordination Act Report has indicated that impacts on the Steelhead are likely to be less than significant. Any mitigation measures required by the Biological Opinion will be added to the project during final design.

Construction effects have the potential to damage small roots of the Moreton Bay Fig, but not the principal components of its root system. Construction would occur sufficiently far from it to avoid any direct impact to its buttress roots, trunk, or branches. The flood control structure should have no effect on subsurface water flow around the fig tree.

Cultural Resources:

Alternatives 6, 8, and 12 have the potential to require removal of a number of historic structures. The City of Santa Barbara awarded a contract to conduct an updated architectural survey of the affected environment in the area of potential effects (APE). The survey report, completed in November 1999, recommended buildings and structures which should be determined eligible for the National Register, California Register or local listing. There are potential adverse effects under the National Historic Preservation Act for Alternatives 6 and 8. There are none for Alternative 12. Mitigation of adversely affected historic properties under Alternatives 6 and 8, may consist of historic recordation of the locally significant historic properties, and possible relocation of important houses. Archeological and Native American monitors will be on-site during all ground disturbing activities to ensure that if any Native American materials or deposits are discovered, the Corps of Engineers and the City of Santa Barbara will be notified immediately.

PERMIT REQUIREMENTS:

Clean Water Act 404 (b)(1) Water Quality Evaluation has been prepared to evaluate discharge of fill or dredged material in the waters of the United States (Appendix E).

The Section 401, State Water Quality Certification, is waived for the project construction as identified in Section 404(r) regulation. The California Regional Water Quality Control has provided a waiver from the Section 401, Water Quality Certification for the project construction and future maintenance. Future maintenance is a part of the project and will be performed by the Local Sponsor. No separate environmental document would be prepared for the future maintenance, because impacts related to the future maintenance have been addressed in the Final EIS/EIR. The USACOE recommends a waiver from the Section 404, Regulatory Permit for the future maintenance.

A Pollution Prevention Plan will be prepared to meet Section 402 Clean Water Action and National Pollutant Discharge Elimination System (NPDES) Storm Water Program requirements prior to the project construction. The selected construction contractor will prepare

a Storm Water Pollution Prevention Plan to reduce erosion and degradation to waters of the United States.

The local sponsor is involved in this project; therefore, a 1603 Streambed Alternation permit would be required prior to construction and the County of Santa Barbara would need to submit an application to the California Fish and Game for the Streambed Alternation Permit. With completion of these actions, the project will comply with Federal and State water quality requirements.

R On December 20, 1999, the USACOE submitted a CCD with project description, HEP Analysis report, biological assessments, and Draft Coordination Act Report to CCC. Since submittal of the CCD, extensive coordination has occurred between USACOE, City of Santa Barbara and CCC staff. The CCC staff expressed their concerns for the project design, and required detailed project plans to examine the project features. In addition, they were concerned about construction of vertical walls within the coastal zone, impacts to water quality, non-point source discharge degrading water quality of the creek, goals, success criteria for the planted vegetation, impacts to endangered species, estuarine habitat, mitigation, sand supply, HEP analysis, visual resources and cultural resources. The CCC also desired to have biological opinions from both agencies, USFWS and NMFS to make their determination. The CCC recommended that the USACOE examine an alternative with vegetated riprap slope or a full vegetated riprap bank below the freeway. The USACOE performed a cursory economic analysis of these alternatives. Results of this conceptual analysis can be found in the Economic Appendix. These alternatives are not economically feasible.

The biological opinion from the USFWS has not received, therefore, the USACOE requested postponement of the public hearing on the CCD until February 2001 or until the biological opinion is received from the USFWS. The USACOE has revised the CCD to incorporate revised project design, mitigation measures and coordination/input received from the CCC staff. The revised CCD can be found in Appendix D of the Final EIS/EIR. The USACOE will make every effort to provide requested information to facilitate the CCC in drafting a staff report/recommendation of the proposed project. Prior to project construction, concurrence from the CCC would be obtained. Therefore, the project would comply with the CZMA.

Two revised Biological Assessments have been prepared for the Federally listed Endangered and Threatened species (Appendix A-EIS/EIR). The Corps has initiated formal Section 7 with the USFWS and NMFS. A Biological Opinion for steelhead has been received from the NMFS. A Biological Opinion from the USFWS will be obtained prior to signing of the Record of Decision.

SECTION - 1 - INTRODUCTION

1.1 STUDY LOCATION:

The Mission Creek drainage area is located in and adjoining the city of Santa Barbara, California, about 100 miles west of the City of Los Angeles. The drainage area, comprising about 11.5-square miles, is a narrow coastal area and extends from the Santa Ynez Mountains on the north to the Pacific Ocean on the south. Mission Creek rises at about 4,000 feet elevation and flows about 8 miles through the City of Santa Barbara to empty into the Pacific Ocean (see Figure 1.1-1). The scope of this study is to evaluate potential benefits, impacts and necessary mitigation requirements associated with flood control measures within the Lower Mission Creek Area. The study is limited to the final 1.2 miles of the creek, from just downstream of Canon Perdido Street to Cabrillo Boulevard (see Exhibit 2 of the Main Report). Please refer to Section 3.5 of the Environmental Impact Statement and Environmental Impact Report (EIS/EIR) for the detailed project description.

1.2 PURPOSE AND SCOPE OF THE ENVIRONMENTAL IMPACT STATEMENT (EIS) AND ENVIRONMENTAL IMPACT REPORT (EIR):

The purpose and scope of this EIS/EIR and Feasibility Study is to: (1) define the flood problems in the Lower Mission Creek Drainage area in Santa Barbara; (2) identify potential solutions; (3) develop a preferred plan and viable alternatives; (4) evaluate environmental impacts for the preferred plan and viable alternatives; (5) incorporate the city of Santa Barbara General Plan and Local Coastal Plan Goals and Policies for each environmental resource in evaluating each alternative including the preferred plan; and (6) develop possible mitigation measures to offset project related impacts. The proposed flood control alternatives for Lower Mission Creek will contribute to national economic development (NED) by reducing the flood losses in the area and protecting the nation's environment. Guidance for this purpose is specified in ER 1105-2-100, "***Guidance for Conducting Civil Works Planning Studies***." The EIS/EIR is prepared in compliance with the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA) and other Federal, State and Local environmental regulations.

The U.S. Army Corps of Engineers (USACOE) conducted a feasibility level study, in cooperation with the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD) and the City of Santa Barbara, of the flooding problem along Lower Mission Creek, Santa Barbara, California. The City of Santa Barbara has an inter-governmental agreement with the SBCFC&WCD to share the non-federal cost of the study and to act as lead agency under CEQA. The proposed project is authorized by Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), approved October 23, 1962. The study identifies, describes, and evaluates feasible plans and fully develops the recommended plan to be submitted to Congress for project authorization. At the request of the local sponsor, the study area has been limited to the final 1.2 miles of creek reaches. The study includes the area just downstream of Canon Perdido Street to the Cabrillo Boulevard Bridge. A previous USACOE Feasibility Study conducted in 1986 revealed that sediment detention measures are not economically feasible. Given the economic infeasibility and considering local opposition to any

form of sediment detention, no detention basin is being considered in this study. The scope of investigation has been further limited to the evaluation of a locally developed alternative, as well as any new alternatives not previously analyzed by the USACOE. The study also includes opportunities to increase ecological values (see details in Section 3 of the EIS/EIR).

The proposed alternative plans consist of creek improvements from Canon Perdido Street to Cabrillo Boulevard. The improvements include short vertical walls with stabilized banks above at a 1.5:1 (V:H) slope above Highway 101 while, below Highway 101, vertical walls would be the dominant bank treatment with sloped banks applied whenever practicable.

1.3 PREVIOUSLY PREPARED ENVIRONMENTAL DOCUMENTS:

Previous studies of the flood problem in Lower Mission Creek include an August 1986 Feasibility Statement/Environmental Impact Statement. That report concluded by recommending channelization of Lower Mission Creek. A Design Memorandum for a rectangular concrete channel, along with a Supplemental EIS (SEIS), was being prepared; however, a detailed design analysis of this alternative indicated that excess sediment would occur in the constructed channel. Therefore, this plan was not implemented. This new feasibility study focuses on alternative solutions, including a locally-preferred semi-natural channel design with possible opportunities for improving the aesthetics of the creek and increasing planting of native and riparian vegetation within the project reach.

This EIS/EIR briefly discusses the existing environment along the lower reaches of Mission Creek, and identifies the primary environmental concerns regarding channelization or other potential flood control alternatives. The EIS/EIR also identifies opportunities for incidental environmental benefits by planting native and riparian vegetation along the upper banks, within habitat expansion zones, construction of a natural bottom channel, enhancing estuarine habitats, and improving recreational opportunities in Lower Mission Creek.

1.4 BACKGROUND AND HISTORY OF THE PROPOSED ACTION:

Mission Creek is the largest stream in the City of Santa Barbara. The principal tributary of Mission Creek is Rattlesnake Creek, which joins the mainstem about a quarter mile above Foothill Road. Flows along Rattlesnake Creek and Mission Creek are either ephemeral or interrupted. These streams contain water during the rainy season and have minimal flows the rest of the year, consisting mainly of isolated pools receiving flows from subsurface run-off. Surface water is usually found year round in the Mission Creek headwaters and estuary. The U.S. Army Corps of Engineers (USACOE) has been involved in this project since 1964. A summary of the USACOE involvement is listed below:

1962	Congress authorized study of flooding problems on Mission Creek.
1964	First Army Corps of Engineers (USACOE) involvement on Mission Creek. Following the Coyote Fire, debris dams were installed on Mission and Rattlesnake Creeks.
1969	USACOE prepared a Feasibility Study for the proposed channelization of Mission

Creek for flood control purposes. This proposal consisted of constructing 12 miles of channel and diversion of flood flows to Arroyo Burro Creek. This plan was not accepted by the local community, because the plan was insensitive to environmental values, especially in the reach upstream from State Street and through Oak Park and along Arroyo Burro Creek. The construction of a channel would have resulted in a significant loss of biological and aesthetic resources.

1970 The project was authorized by the U.S. Congress. The USACOE conducted further studies in coordination with the City of Santa Barbara Environmental Quality Advisory Board. Various alternatives were developed, but the USACOE and the advisory board could not agree on a solution to the flood problems along Mission Creek. The project was put on hold due to community concerns about environmental impacts.

1973-75 A Flood Plain Information report covering streams in the City of Santa Barbara (including Mission Creek) was prepared in April 1975. USACOE worked with the City Environmental Quality Advisory Board to develop flood control alternatives for Mission Creek. No plan acceptable to both USACOE and local interests was found. Concerns focused around the impacts of channelization on biological resources and aesthetics.

1978 Under the authority of the National Flood Insurance Act of 1968, a Flood Insurance study covering streams in the City of Santa Barbara, including Mission Creek, was prepared in June 1978. Flood Insurance Rate Maps were prepared in December 1978. The Study and Maps enabled the City of Santa Barbara to convert to the regular program of flood insurance by the Federal Insurance Administration and to aid local and regional planners in their efforts to promote sound land use and flood plain development.

1978-1980 The City and County requested assistance from the USACOE following substantial flooding in 1978 and 1980. The City of Santa Barbara believed that a feasible plan could be developed through public participation and an examination of alternatives.

1982 The USACOE met with County Flood Control to develop a process for review of a possible flood control project.

1983 April - Citizen's Advisory Committee established by City Council to work with USACOE to select a project which meets both flood control needs and community concerns. The Committee met 13 times over a period of three years.

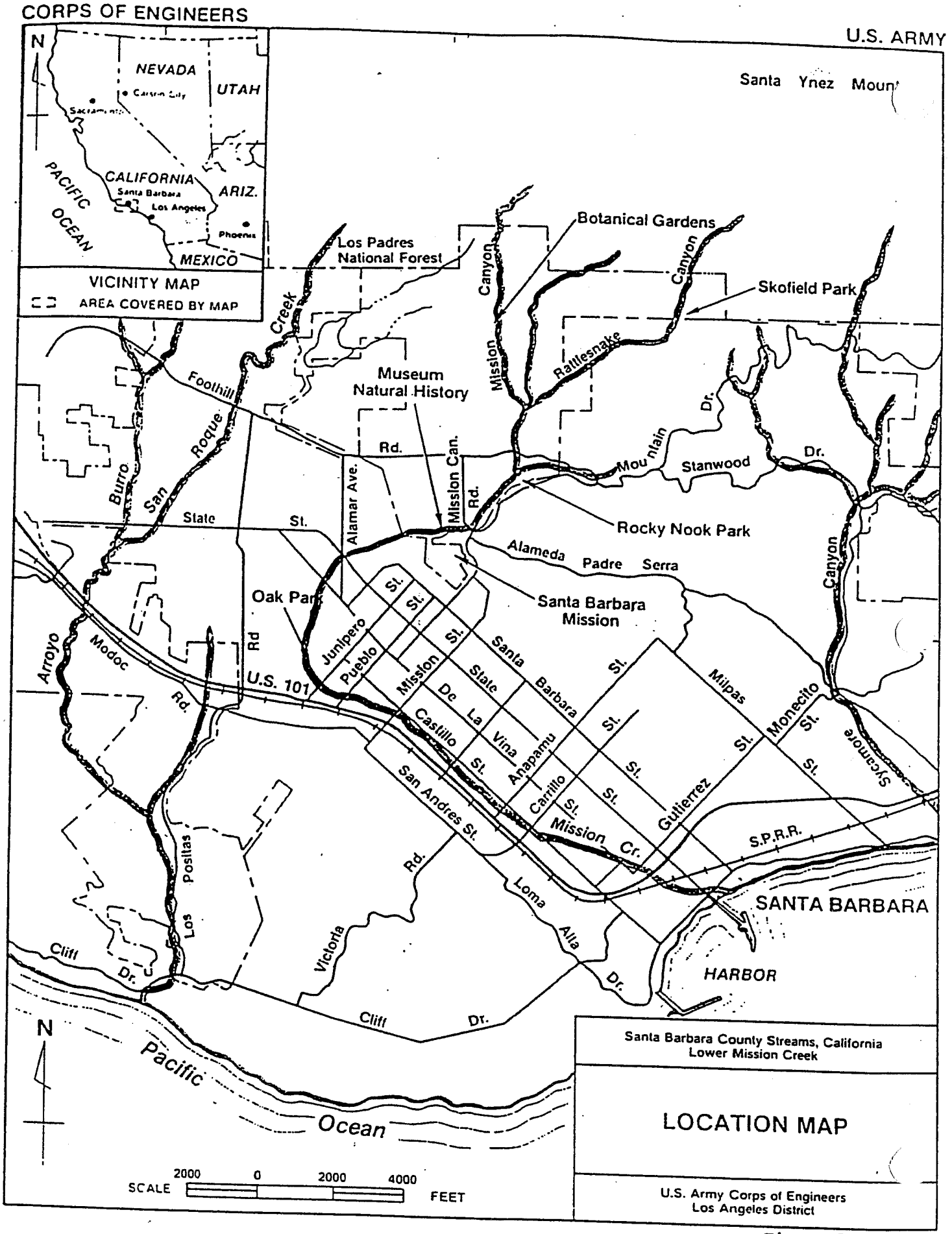
CORPS OF ENGINEERS
U.S. ARMY
NEVADA
UTAH
CALIFORNIA
ARIZ.
PACIFIC OCEAN
MEXICO
VICINITY MAP
AREA COVERED BY MAP
Santa Ynez Mount
Botanical Gardens
Los Padres National Forest
Skofield Park
Museum Natural History
Rocky Nook Park
Santa Barbara Mission
Oak Park
U.S. 101
S.P.R.R.
SANTA BARBARA
HARBOR
Pacific Ocean
SCALE 2000 0 2000 4000 FEET
Santa Barbara County Streams, California
Lower Mission Creek
LOCATION MAP
U.S. Army Corps of Engineers
Los Angeles District

Figure 1.1-1

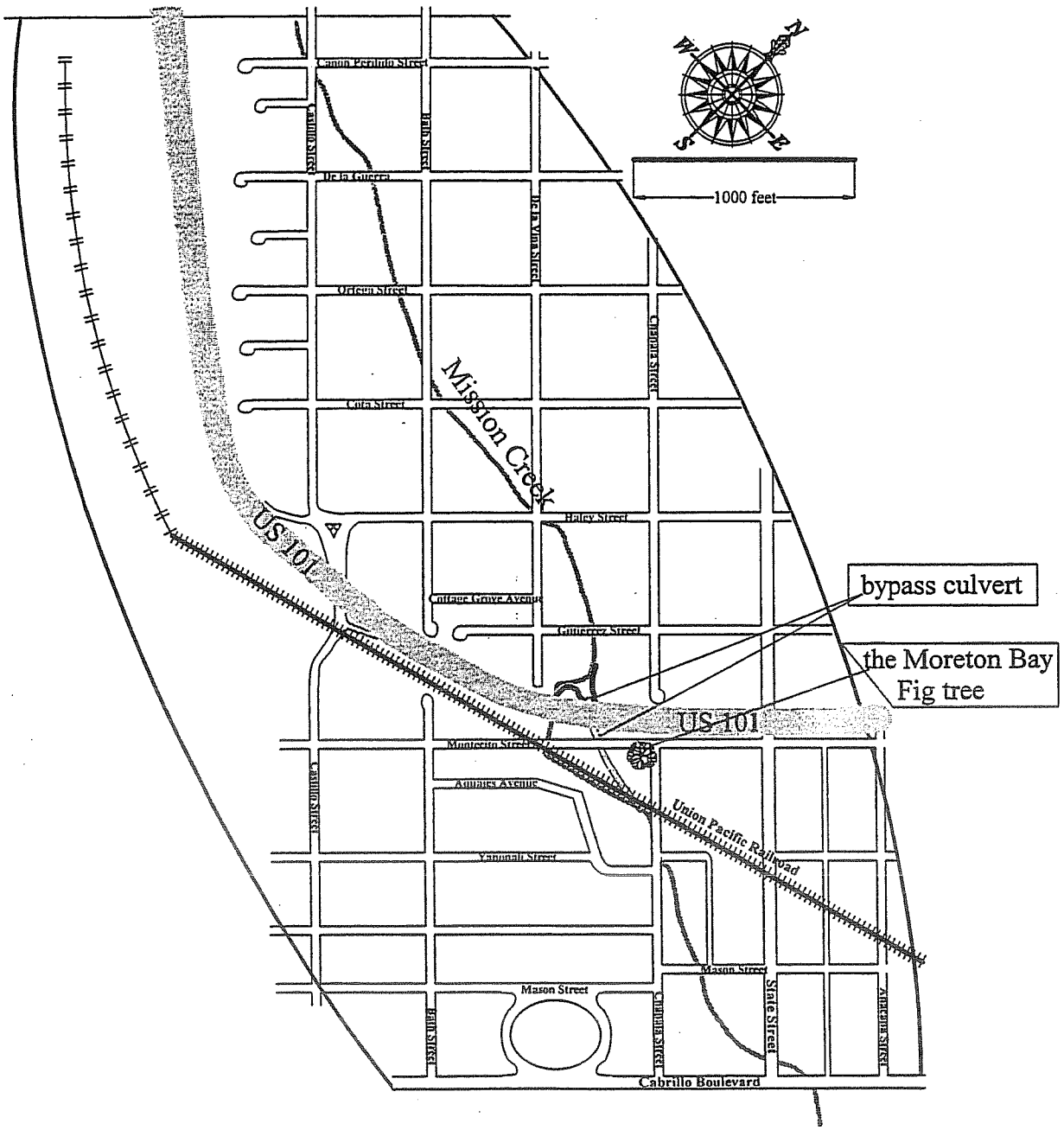

Figure 1.1.2: Study Area Map: the lower-most reach of Mission Creek in the City of Santa Barbara.

1986	June - Citizen's Advisory Committee recommended the Lower Mission Creek Project to City Council. This project was fully concrete-lined and provided 100-year flood control. No debris basins were included in the design.
	July - The City Council, Planning Commission and the County Board of Supervisors conceptually endorsed The Lower Mission Creek Project.
	August - Feasibility Study and Final Environmental Impact Statement completed by USACOE. This study included several structural, non-structural and No-Action Alternatives. The alternative recommended in this study, referred to as the Lower Mission Creek Project, was authorized by Congress in the Water Resources Development Act of 1988.
	August - City Council formed a Mission Creek Alternatives Task Force to look at other alternatives to the project, based on public concerns regarding the endorsed project.
1987	January - USACOE issued its Record of Decision approving the project.
1987	The Mission Creek Alternatives Task Force reviewed and rejected an insurance alternative because it would not provide adequate coverage if a flood occurred before enough money could be collected to buy properties in the flood area. In addition, it was illegal for the City to carry out such an insurance scheme.
1988	Mission Creek Alternatives Task Force received a grant from the State Dept. of Water Resources under the Urban Streams program to pursue other structural flood control alternatives. Spectra Information & Communications was hired by the City to prepare the report.
1989	Spectra report released. Based on a different flood flow rate calculation methodology, the report proposed alternatives for Lower Mission Creek that would be more natural in design, including a natural bottom and gabion sides with the amount of allowed vegetation to be based on the proposed width.
1989-93	USACOE worked on Preliminary Engineering and Design for the endorsed project.
1992	July - Scoping Meeting for Joint Supplemental EIS/EIR held before the City Environmental Review Committee. Work begins on preparation of environmental document.
	September - Request for Proposal distributed by the City to complete peer review of project design with emphasis on the rate of flood flow, the effect of siltation on project design and the impacts on groundwater recharge.
	December - Selection of David Dawdy to provide peer review.

1993	March - Cost sharing agreement between City and County Flood Control for environmental review, project administration, local engineering, preliminary appraisal and other costs; also includes designation of the City as lead agency under CEQA. Approval of contract with David Dawdy for peer review and Interface for air quality and noise studies.
1993	July - Letter from USACOE proposing to place the project on inactive status due to debris control issues. All work on EIR/SEIS stopped.
	September - Establishment of Mission Creek Consensus Group to develop an alternative that is acceptable to the community as a whole. Membership includes Board of Supervisors and Council members and representatives of the environmental community and business/property owners.
1993-94	A series of Consensus Group meetings to determine criteria for an acceptable flood control project, review and preparation of a report by Kennedy/Jenks regarding economic and environmental feasibility of various alternatives and selection of alternatives for further study.
1994	September - Presentation of Consensus Group recommended alternatives to the Board of Supervisors and City Council. Letter sent to USACOE requesting that a Reconnaissance Study regarding the feasibility of the recommended alternative be prepared.
	December - Public Workshop held by USACOE to gather input for Reconnaissance Study.
1995	November - USACOE, Santa Barbara County Streams - Lower Mission Creek Reconnaissance Flood Control Study.
1997	August - Public Workshop held by USACOE to gather input for Feasibility Study.
1998	October - Scoping Hearing held by USACOE and the City to gather input on environmental impacts to be considered in the EIS/EIR.

1.5 NEPA AND CEQA COMPLIANCE:

The U.S. Army Corps of Engineers (USACOE), the Santa Barbara County Flood Control and Water Conservation District (SBCFC&WCD) and the City of Santa Barbara are responsible for the preparation of Environmental Impact Statement (EIS) and Environmental Impact Report (EIR). The USACOE is a Federal agency; Santa Barbara County, the local sponsor, is a local agency. Therefore, the proposed project needs to comply with the National Environmental Policy Act (NEPA), the Council on Environmental Quality (CEQ), and the California Environmental Quality Act (CEQA). Because the entire project is within the incorporated limits of the City of Santa Barbara, the County and the City agreed that the City would act as the Lead Agency under CEQA. The NEPA and CEQA regulations require evaluation of all environmental resources for the preferred alternative and all feasible alternatives. To offset project related impacts, appropriate mitigation measures are included in this document.

The study assesses and evaluates present and future without-project conditions, project alternatives, future maintenance, beneficial and adverse impacts (physical environment, land use, geology, biology, air quality, water quality, groundwater, recreation, aesthetics, cultural resources, transportation/communications, hazardous waste, socioeconomics and safety) of the proposed alternatives, and development of mitigation measures, to reduce the project related impacts. Study results and recommendations are coordinated fully with the concerned resource agencies.

1.5.1 NEPA/CEQA Process

Federal funding for the planning, design, and construction of the Lower Mission Creek Project is provided jointly by the USACOE and SBCFC&WCD. The Santa Barbara County Flood Control District is responsible to perform all activities associated with operation and maintenance of the project. The involvement of a federal agency and a local agency requires compliance with both NEPA and CEQA. As per 40 CFR 1505.2 of NEPA and Section 15170 of CEQA, the USACOE, the City of Santa Barbara and SBCFC&WCD have prepared this joint EIS/EIR. The procedure for NEPA and CEQA is depicted in Table 1-1.1.

Notice of Intent and Notice of Preparation:

The USACOE and the City of Santa Barbara began the scoping process for the project by publishing a Notice of Intent (NOI) in the Federal Register and distributed Notices of Preparation (NOP) to potentially affected agencies and the public. The NOI and NOP were prepared and published in the Federal Register and local newspaper respectively on October 13, 1998. (See details for NOI and NOP in Section 2.4.1 of this EIS/EIR and included in Appendix I of the EIS/EIR.)

Draft EIS/EIR Procedure:

R The Draft EIS/EIR was distributed for public review and comment in accordance with the federal (NEPA) and state (CEQA) processes. Copies were submitted to the U.S. Environmental Protection Agency (EPA) and State Clearinghouse for agency distribution. The Draft EIS/EIR was distributed to all concerned federal, state and local agencies, environmental groups, and interested individuals. Copies of the EIS/EIR were available at area public libraries for the interested public to review. The USACOE filed the Draft Feasibility Report and the EIS/EIR with the Environmental Protection Agency. A Notice of Availability (NOA) of the Draft EIS/EIR was published in the Federal Register on December 23, 1999. The City of Santa Barbara published a notice in a newspaper of the availability of the Draft EIS/EIR to comply with CEQA Regulations. The City also sent a NOA to the State clearing house, concerned agencies, property owners and other concerned parties on December 23, 1999. The public review was initiated on December 23, 1999 for 45-days. The date, time, and location of the public hearing were announced in the local newspapers. A Notice of Public Review and Public Meeting was distributed to affected property owners, tenants and interested parties. The Public Meeting (Hearing) was conducted on January 19, 2000 at Santa Barbara, in the Council Chambers at Santa Barbara City Hall. Comment and responses on the Draft EIS/EIR can be found in Appendix K of the Final EIS/EIR (see details in Section 2 of the EIS/EIR). The Final EIS/EIR will be filed with the EPA and certified by the City of Santa Barbara. All correspondence related

to the release of the Draft EIS/EIR and Public Hearing are located in the Appendix I-1.

Final EIS/EIR Procedure:

Following completion of the Final EIS/EIR, the document will be distributed to agencies, organizations, and persons that submitted comments on the Draft EIS/EIR. A NOA will be published in the Federal Register, local newspapers and sent to interested agencies, property owners and other concerned parties stipulating that the Final EIS/EIR will be available for a 30-day public review period prior to signing a Record of Decision (ROD). The ROD is a written public record explaining why the USACOE has chosen a particular course of action. A summary of the selected alternative and mitigation measures to minimize or avoid environmental impacts will be identified in the ROD. Similarly, the Santa Barbara City Planning Commission will certify that the EIR has been completed in compliance with CEQA, and the City Council and the Board of Supervisors will state that they reviewed and considered the information in the EIR prior to approving the project (CEQA Guidelines, Section 15090). The County and City must indicate its support of the project in order for the USACOE to pursue Project Engineering and Design. A cost-sharing agreement would be prepared and signed by the USACOE and SBCFC&WCD prior to project construction. Construction of the proposed project cannot be initiated before the ROD is signed and approved, the Final EIR is certified, and the specific CEQA findings are adopted.

TABLE 1.1-1

NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)
CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA) - PROCEDURE FOR
ENVIRONMENTAL IMPACT STATEMENT AND ENVIRONMENTAL IMPACT REPORT

NEPA:	CEQA:
NEPA applies to all federal agencies. Federal agencies shall prepare an environmental document to disclose project related impacts and provide mitigation to minimize impacts.	CEQA requires all California public agencies to comply with both procedural and substantive requirements. The agency shall prepare an environmental document to disclose project related impacts and provide mitigation to minimize impacts.
Determine Lead/Co-lead and Cooperating Agencies.	Determine Lead, Responsible and Trustee Agencies.
Publish Notice of Intent (NOI)-The first formal step in EIS preparation.	Prepare Initial Study.
Publish NOI in the Federal Register	Prepare Notice of Preparation (NOP). File with the State Clearinghouse and Responsible Agencies. Provide 30 days for review. Provide legal notice in a newspaper. Invite public comments on the scope of the EIR analysis.
Conduct Scoping Process (Public Participation)	Early consultation. Scoping meetings.
Prepare Draft EIS (Analysis of the preferred and viable alternatives and development of mitigation measures to minimize impacts). Include requirements for and analysis of required permits (CCD, 404/401 and others applicable to the project).	Prepare Draft EIR analysis of the preferred alternative. Identify project impacts and mitigation. Identify residual and cumulative impacts. Identify environmentally superior alternative. CEQA includes substantive provisions requiring agencies to avoid or mitigate impacts disclosed in an EIR. Provide mitigation monitoring plan. Analysis of permit requirements is necessary for CEQA documents.

File Draft EIS with EPA (EPA publishes notice of availability in the Federal Register)	Submit 10 copies of EIR to the State Clearinghouse, which distributes copies to interested agencies. Public notice announcing Draft EIR availability for review issued to the County Clerk. The local agency provides legal advertisement in the newspaper of the availability of the Draft EIR.
Circulate Draft EIS for public review (45 days from the date appeared in the Federal Register for the EIS review)	Circulate Draft EIS for public review and responsible agencies (45 days from the date appeared in the newspaper and filing with the State Clearinghouse).
Public Hearing after distribution of the Draft EIS to obtain public concerns on the Draft EIS, including proposed alternatives.	CEQA does not require public hearing during Draft EIR public review period. However, most agencies require such hearings, including the City of Santa Barbara.
Incorporate verbal and written comment/response in the EIS.	Incorporate comment/response in the EIR. Prepare Final EIR.
Circulate Final EIS for public review (provide copies to the agencies/public which provided comments-30 days)	Provide comment/responses to the agencies who provided comments on Draft EIR at least 10 days prior to certifying the Final EIR.
File Final EIS with EPA. Comment period starts from the date the Notice of Availability appears in the Federal Register.	City Planning Commission, acting as the Lead Agency under CEQA, certifies Final EIR.
Prepare Record of Decision (ROD). The ROD identifies project features/alternatives, findings, public concerns and mitigation. The USACOE higher authority signs the ROD prior to implementation of the project construction.	Make agency decision (City Council and Board of Supervisors). CEQA requires agencies to prepare statement of overriding considerations at the time of project approval if impacts cannot be mitigated to less than significant. Prepare Findings of Fact for each significant impact identified in the EIR. Findings are written statements made by the decision-making bodies of the Lead and Responsible Agency

1.6 COMPLIANCE WITH APPLICABLE FEDERAL AND STATE STATUTES:

The following environmental laws, Executive Orders, and other policies have been considered in the planning process as noted below:

FEDERAL:

National Environmental Policy Act of 1969 (Public Law 91-190) as amended. This EIS has been prepared in accordance with the requirements of NEPA of 1969 (42 USC 43221, as amended) and the CEQ Regulations for Implementing the Procedural Provisions of NEPA (40 CFR 1500-1508), dated 1 July 1988. NEPA requires that agencies of the Federal Government shall implement an environmental impact analysis program in order to evaluate "major federal actions significantly affecting the quality of the human environment." A "major federal action" may include projects financed, assisted, conducted, regulated, or approved by a federal agency. NEPA regulations are followed in the preparation of this EIS.

ER-200-2-2, 33 CFR 230, March 1988. This regulation provides guidance for implementation of the procedural provisions of the National Environmental Policy Act (NEPA) for the Civil Works Program of the USACOE. It supplements Council on Environmental Quality (CEQ) regulations 40 CFR 1500-1508, November 29, 1978, in accordance with the CEQ regulations. Wherever the guidance in this regulation is unclear or not specific, the reader is referred to the CEQ regulations. This regulation is applicable to all USACOE responsibility for preparing and processing environmental documents in support of civil works functions.

ER-1105-2-100 Regulation April 2000. ER-1105-2-100 provides guidance for conducting Civil Works planning studies and related programs by the U.S. Army Corps of Engineers. Guidance provided in these regulations has been followed in the preparation of this document.

Clean Water Act of 1977 (Public Law 95-217). The Clean Water Act governs discharge or dredge of materials in the waters of the United States and it governs pollution control and water quality of waterways throughout the U.S. Its intent, in part, is to restore and maintain the biological integrity of the nation's waters. The goals and standards of the Clean Water Act are enforced through permit provisions. Sections 404, 401 and 402 of the Clean Water Act pertain directly to the proposed project. Section 404 outlines the permit program required for dredging or filling the nation's waterways.

The USACOE does not issue itself a permit for civil works projects. Therefore, a Section 404(b)(1) analysis is prepared and included in the EIS/EIR Appendix E. Section 404(b)(1) addresses project related impacts to the waters of the United States and provides appropriate mitigation measures to minimize impacts. Section 230.10(a)(2) of the 404(b)(1) guidelines states that "an alternative is practicable if it is available and capable of being done after taking into consideration costs, existing technology and logistics in light of overall project purposes". A future maintenance plan is included in the EIS/EIR, and impacts related to future maintenance are identified. Mitigation measures for future maintenance for the life of the project are included in the EIS/EIR. Santa Barbara County must follow all the environmental commitments identified in the EIS/EIR for future maintenance. In the future, if conditions change or new endangered and threatened species are listed, the local sponsor will need to coordinate with the appropriate resource agencies regarding new species introduced in the project area and perform

compliance with the environmental regulations.

R On December 20, 1999, Santa Barbara County submitted an application for a Section 404,USACOE Regulatory, permit with the Draft EIS/EIR. A General Permit could be renewable at intervals of 5 to 10 years or Section 404, or Regulatory Permit for Water Quality, could be waived under 404 (r) regulations. Future maintenance is an integral part of the project design, impacts and mitigation measures for future maintenance are included in the Final EIS/EIR. The EIS/EIR would be submitted to Congress for authorization of the project construction and appropriation of funding.

Section 404(r) of the Clean Water Act, waives the requirement to obtain either the State Water Quality Certification or the 404 permit if:

"The requirement to obtain Section 401 Water Quality Certification for the project construction is waived if information on the effects of the discharge of dredged or fill material into waters of the United States, including the Section 404 analysis, is included in an EIS/EIR submitted to Congress before Congress authorizes the project or appropriates funds for construction."

R On December 20, 1999, the USACOE and the Santa Barbara County Flood Control District submitted a request for a waiver from the Section 401 Water Quality Certification (Appendix E-1) for project construction and future maintenance. Future maintenance is a part of the project. By letter dated February 2, 2000, the California Regional Water Quality Control Board (CRWQCB) provided a waiver from the Section 401Water Quality Certification for the project construction and the future maintenance (Appendix E-1).

R Coordination with USACOE Regulatory Branch is on going. A working copy of the F-4package has been provided to the Regulatory Field Office (Ventura) for their review. The USACOE follows a policy guideline (ER-200-2) to accomplish the study of any flood control project (Water Resources Projects). Various milestone for a feasibility study need to be met (from F1 to F9) in order to accomplish the objectives and construction of the project. The F4 is one of the milestones to be accomplished; it includes baseline conditions, initial analysis of technically feasible alternatives. The Regulatory Branch requested a Mitigation Monitoring Plan for project implementation and future maintenance. On June 22, 2000, the Environmental Resources Branch provided an updated Project Description, Mitigation Monitoring Plan, revised Biological Assessments (for steelhead and tidewater gobies) and revised Hydraulics/Engineering Analysis to the Regulatory Branch.

Coordination with the California Regional Water Quality Control Board (CRWQCB) was performed during preparation of the Draft EIS/EIR. The Section 404(r) regulation was forwarded to the CRWQCB on November 9, 1999 (see details in coordination section of the Draft EIS/EIR). The USACOE will also coordinate with the CRWQCB for requirements of the National Pollutant Discharge Elimination System (NPDES) and storm water program prior to project construction. On June 21, 2000, the USACOE provided a package to the CRWQCB of the revised project description, mitigation monitoring plan, revised biological assessments and hydraulic/engineering analysis and project plans and drawings for their information.

A Notice of Intent will be submitted to the California Sate Water Resources Control Board to comply with Section 402 of the Clean Water Act. A Storm Water Pollution Prevention Plan (SWPPP) will be prepared to meet the State's requirements of the NPDES Storm Water Program prior to project construction. The construction contractor will prepare the SWPPP and have it available on the project construction site.

Endangered Species Act of 1973 (Public Law 93-205), as amended. As an early planning tool, the USACOE requested a Planning Aid Letter from the U.S. Fish and Wildlife Service (USFWS), a letter which would address potential concerns for all threatened, endangered, and candidate species recognized in the general vicinity. USFWS replied March 26, 1997 (Appendix B). Five species, either Federally endangered or threatened, inhabit the project area: tidewater goby (*Eucyclogobius newberryi*), steelhead trout (*Oncorhynchus mykiss*), brown pelican (*Pelicanus occidentalis*), western snowy plover (*Charadrius alexandrinus nivosus*), and California least tern (*Sterna antillarum browni*). The red-legged frog (*Rana aurora draytoni*) also appears on that list, but the Service later concluded this threatened amphibian does not occur within the project area (Sanders, 1998).

During preparation of the Draft EIS/EIR, the USACOE has prepared two biological assessments to evaluate project construction and future maintenance related impacts on fish species protected under the law and to initiate formal Section 7 Consultation with both USFWS and National Marine Fisheries Service (NMFS). Biological Assessments, dated December 1999 are located in Appendix A of the Draft EIS/EIR. The first pertains to potential impacts to the tidewater goby. It describes measures to minimize adverse effects and expansion of feeding habitat which could offset unavoidable incidental take of gobies. The second pertains to steelhead. It describes measures which should avoid all impacts to this species.

R After publication of the Draft EIS/EIR, the project design was modified due to hydraulic/engineering, real-estate constraints, and resource agencies concerns. Additional structural features and mitigation measures were incorporated in the project design and project description. To reflect these changes, the USACOE revised the biological assessments for both Federally listed species, steelhead and tidewater gobies. Revised biological assessments were submitted to both agencies, NMFS and USFWS, on June 16, 2000 and June 21, 2000, respectively (See Appendix A of the Final EIS/EIR). By letter dated August 2, 2000, the NMFS provided a Final Biological Opinion for the project construction and the future maintenance (Appendix B-1). The USFWS requested for additional information to determine project related impacts to the tidewater gobies. The biological opinion from the USFWS is pending. Prior to implementation of project construction, a biological opinion would be obtained. Conditions identified in the biological opinion would be followed during project construction and future maintenance. Therefore, the proposed project will comply with the requirements of the Endangered Species Act.

Fish and Wildlife Coordination Act of 1958 (Public Law 85-624). In response to the requirements of this Act, the USACOE is coordinating with the USFWS and the California Department of Fish and Game (CDFG) during the initial and current stages of planning. The USFWS provided a Draft Coordination Report on October 6, 1999. A Final Coordination Act Report was provided on May 3, 2000 (Appendix B-1) which evaluates two potential flood control alternatives and the environmental benefits arising from these flood control designs. During preparation of the Draft EIS/EIR, a Biological Assessment was prepared and included in

Appendix A of the Draft EIS/EIR and other correspondence with the USFWS is located in Appendix B-1. The USACOE has coordinated extensively with the USFWS, NMFS and CDFG in the development of the proposed alternatives and mitigation measures. The USFWS and NMFS agencies participated the site visits, providing direct or indirect input in preparation of the HEP analysis. These agencies participated in the F-4 and the Alternative Formulation Briefing (AFB) conference and provided their input to protect biological resources.

R Coordination with the with the USFWS, NMFS and CDFG is on going. The USACOE revised the biological assessment for the tidewater gobies. On June 21, 2000, a revised biological assessment, revised project description, mitigation monitoring plan, and hydraulics/engineering analysis were provided to the USFWS.

Migratory Bird Treaty Act, as amended (16 USC 703-711). Requires management and protection of migratory birds. The Migratory Bird Treaty Act (1916), agreed upon between the United States and Canada; the Convention for the Protection of Migratory Birds and Animals (1936), agreed upon between the United States and Mexico; and subsequent amendments to these Acts provide legal protection for almost all breeding bird species occurring in the United States. These Acts restrict the killing, taking, collecting, and selling or purchasing of native bird species or their parts, nests, or eggs. Certain game bird species are allowed to be hunted for specific periods determined by federal and state governments. The intent of the Act is to eliminate any commercial market for migratory birds, feathers, or bird parts, especially for eagles and other birds of prey. The proposed project complies with this Act.

Executive Order 11988, Floodplain Management, May 24, 1977. Under this Order, the USACOE shall take action to avoid development in the base (100-year) floodplain unless it is the only practicable alternative; to reduce hazards and risks associated with floods; to minimize the impact of floods on human safety, health and welfare; and to restore and preserve the natural and beneficial value of the base floodplain. A determination has been made that no practicable alternative exists to location of the project in the floodplain of Lower Mission Creek.

Executive Order 11990, Protection of Wetlands, May 24, 1977. Section 2 of the Order states that each agency shall avoid undertaking new construction in wetlands unless there is no practicable alternative, and that the proposed action include all practicable measures to minimize harm to wetlands. The proposed project will have no permanent adverse effect on wetlands. Indeed, the area of estuarine conditions will actually expand. Appropriate mitigation would be developed to mitigate impacts to riparian and aquatic habitat.

R **National Historic Preservation Act of 1966 (Public Law 89-665 as amended December 12, 1980).** The area of potential effects (APE) was originally surveyed in 1985 for an earlier project proposal. In the interim, a new project description has been formulated and additional structures in the APE are now 14 years older and need to be reevaluated. A record and literature search and preliminary field investigations of the original APE were conducted by the USACOE in September 1997. In December 1998, the proposed project was expanded to include new alternatives. The City of Santa Barbara (City) supplied the USACOE with a list of additional historic structures within the revised APE. Because of these studies, numerous historic structures were identified in the APE. A consultant has prepared a report to the City which updates the historic property survey with evaluation recommendations. The architectural survey report concluded that several properties are eligible for listing on the National Register of

Historic Places (the report is on file at the City of Santa Barbara). A letter was transmitted to the State Historic Preservation Officer (SHPO) with the supporting documentation. A response was received from SHPO on August 3, 2000, concurring with our determinations of eligibility and effect (Appendix J). The project as planned will have no adverse effect on properties that are eligible for inclusion or, are included in the National Register of Historic Places. The project complies with Section 106.

Clean Air Act (Public Law 91-604), as amended. Section 118 specifies that any Federal activity which may result in discharge of air pollutants must comply with Federal, State, interstate, and local requirements respecting control and abatement of air pollution. Section 176(c) requires that all Federal projects conform to Environmental Protection Agency-approved or promulgated State Implementation Plans. Coordination with the Santa Barbara County Air Pollution Control District (SBCAPCD) has been established and is ongoing. Air quality analysis for the proposed project has been conducted and is included in Section 8 of this EIS/EIR, and air quality data are included in an Appendix G. The USACOE has coordinated with the SBCAPCD for the air quality analysis methodology. The air quality analysis was performed for the worst case scenario. The analysis revealed that the emissions generated by project construction and future maintenance activities would be below State and Federal thresholds. The conformity determination is not required for the proposed project because the emissions generated by the proposed construction are below the Federal standard. A Record of Non Applicability (RONA) is included in Appendix G.

Executive Order 12898, Environmental Justice. The alternatives developed for the EIS/EIR were based on a set of criteria that did not discriminate on the basis of race, color, or national origin. This Executive Order requires that the EIS/EIR analyze the impacts of federal actions on minority and low-income populations and provides opportunities for input on the EIS/EIR by affected communities. During EIS/EIR scoping, all interested members of the public, including minority communities and low-income populations, were invited to participate in the environmental process for this action.

Farmland Protection Policy Act, December 22, 1981 (Public Law 97-98). This Act requires that Federal agencies identify and take into account the adverse effects of Federal programs on the preservation of farmland; consider alternative actions, as appropriate, that could lessen such adverse effects; and assure that such Federal programs, to the extent practicable, are compatible with State, unit of local government, and private programs and policies to protect farmland. The proposed project area does not support any agricultural land.

Federal Water Project Recreation Act (Public Law 89-72), July 9, 1965. This Act requires that any Federal water project must give full consideration to opportunities afforded by the project for outdoor recreation and fish and wildlife enhancement. The proposed project would provide opportunity for recreational activities by development of habitat expansion zones, including recreational use areas, which would be primarily passive in nature.

Wild and Scenic Rivers Act (Public Law 90-542, as amended through Public Law 96-580, December 23, 1980). Provides for preservation of certain selected rivers and their immediate environments that possess outstandingly remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values in free-flowing condition. The Proposed Action or alternatives affect no wild or scenic rivers.

Executive Order 13045, "Environmental Health and Safety Risks to Children" (62 Fed. Reg. 1988s (1997). On April 21, 1997, President Clinton signed this Executive Order. It is designed to focus Federal attention on actions that affect human health and safety conditions that may disproportionately affect children. Executive Order 13045 requires that federal agencies, to the extent permitted by law, and appropriate and consistent with the agency's mission:

Shall make it a high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children.
Ensure that its policies, programs, activities, and standards address disproportionate risks to children that result from environmental health risks or safety risks.

Consistent with Executive Order 13045, the project would not disproportionately impact children in the region of influence.

Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC § 4601 (1996)). In order to acquire private property, the Federal government must follow guidelines set forth under the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (42 USC § 4601 (1996)). The Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act was created to ensure that (1) owners of real property to be acquired for Federal and federally assisted projects are treated fairly and consistently; (2) persons displaced as a direct result of Federal or federally assisted projects are treated fairly; and (3) agencies implement these regulations in a manner that is efficient and cost effective. The Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act also contains provisions for just compensation, policies for acquisition, and relocation requirements. SBCFC&WCD and the City of Santa Barbara are responsible for property acquisition and relocation activities. SBCFC&WCD and the City will comply with this Act for any alternatives that require the acquisition of private property, the relocation of residents, or both. Also refer to the applicable state relocation laws.

Coastal Zone Management Act (Public Law 92-583). The Coastal Zone Management Act (CZMA) preserves, protects, develops, and, where possible, restores or enhances the Nation's coastal zone resources for this and succeeding generations. By letter dated December 15, 2000, the USACOE submitted a Coastal Consistency Determination (CCD) to the California Coastal Commission (CCC), in satisfaction of CZMA requirements (Section 106(d)) to certify consistency to the maximum extent practicable with an approved State Coastal Zone Management Plan. The proposed project is partially within and will have an effect on the coastal zone, as established by the California Coastal Act of 1976. Mr. James Raives of the California Coastal Commission (CCC) has determined that a CCD will be required for the Lower Mission Creek Flood Control Project. The CCD dated December 1999 is included in Appendix D of the Draft EIS/EIR. In addition to Coastal Act policies, the City of Santa Barbara General Plan and Local Coastal Plan Goals and Policies are included in the EIS/EIR and in the analysis of environmental resources.

R Since submittal of the CCD, extensive formal and informal coordination has occurred between USACOE, the City of Santa Barbara and the CCC staff. The CCC requested additional information to evaluate the proposed project for consistency with the habitat, water quality, sand supply, visual, and archaeological policies of the Coastal Act (see Section 1.7 for details on

coordination). In addition, the CCC felt that completion of the Section 7 consultation, including final biological opinions (as required by Endangered Species Act), is essential in preparation of a staff report and recommendation for the proposed project. The USACOE provided additional available information via e-mail and by letter, dated June 21, 2000. The biological opinions were not included in that package. Therefore, the USACOE requested postponement of the public hearing on the CCD until February 2001 or until the biological opinion is received from the USFWS. The USACOE has revised the CCD to incorporate revised project design, mitigation measures and coordination/input received from the CCC staff. The revised CCD can be found in Appendix D of the Final EIS/EIR. The USACOE will make every effort to provide requested information to facilitate the CCC in drafting a staff report/recommendation of the proposed project. Prior to project construction, concurrence from the CCC would be obtained. Therefore, the project would comply with the CZMA.

STATE:

California Environmental Quality Act (CEQA) (Public Resources Code §§22,000 et seq.). CEQA requires state and local agencies to disclose and consider the environmental implications of their actions. It further requires that agencies, when feasible, avoid or reduce the significant environmental impacts of their decisions. This document meets the goals, policies, and requirements of CEQA. Information and analysis to meet CEQA requirements are included within this EIS/EIR for each resource.

California Coastal Act of 1976, as amended. The Act specifies basic goals for coastal conservation and development related to protection, enhancement and restoration of coastal resources, giving priority to "coastal-dependent" uses and maximizing public access to California residents and visitors. The Act defines the "coastal zone" of California, which generally extends three miles out to sea and inland generally 1,000 yards. It may be extended further inland in certain circumstances. It is also less than 1,000 yards wide in some urban areas. Each city and county in California which is on the coast must prepare a Local Coastal Program (LCP) for all areas within the coastal zone. The LCP includes Land Use Plans, zoning ordinance amendments and map changes to reflect the Coastal Act and LCP goals and policies at the local level. See discussion of required federal coordination of the Coastal Zone Management Act with the California Coastal Act above.

California Endangered Species Act (Cal. Fish and Game Code §§ 2050-2116). The California Endangered Species Act (CESA) parallels FESA. As a responsible agency, the California Department of Fish and Game (CDFG) has regulatory authority over state-listed endangered and threatened species. Since the proposed project may affect species that are listed as threatened or endangered under both the state and federal Endangered Species Acts and, since the project is subject to CEQA review and federal review pursuant to NEPA, the CDFG shall participate to the greatest extent practicable in the federal endangered species consultation. The state legislature encourages cooperative and simultaneous findings between state and federal agencies. Further, the General Counsel for the CDFG has issued a memorandum to CDFG regional managers and division chiefs clarifying the CESA consultation process wherein, if a federal Biological Opinion has been prepared for a species, the CDFG must use this Biological Opinion in lieu of its own findings unless it is inconsistent with CESA. CDFG Code Section 2095 authorizes participation in federal consultation and adoption of a federal Biological

Opinion. By adopting the federal Biological Opinion, the CDFG need not issue a taking permit per Section 2081 of the state Code. If the Biological Opinion is consistent with CESA, the CDFG will complete a 2095 form in finalizing the adoption of the Biological Opinion. If the federal Biological Opinion is found to be inconsistent with CESA, the CDFG will issue its own Biological Opinion per Section 2090 of the state Code and may issue a 2081 take permit with conditions of approval. The proposed project would comply with this Act.

Streambed Alteration Agreement (Cal. Fish and Game Code, § 1600). Under Chapter 6 of the California Fish and Game Code, CDFG is responsible for protecting and conserving the state's fish and wildlife resources. Sections 1600 et seq. of the Code define the responsibilities of CDFG, and the requirement for public and private applicants to obtain an agreement to:

> *. . .divert, obstruct, or change the natural flow or bed, channel, or bank of any river, stream, or lake designated by CDFG in which there is at any time an existing fish or wildlife resource or from which those resources derive benefit, or will use material from the streambeds designated by the department.*

Federal agencies are exempt from Section 1601, but the SBCFC&WCD is a participant in the project; therefore, SBCFC&WCD will file a Section 1601 application for a streambed alteration agreement. The local CDFG warden or unit biologist typically has responsibility for issuing streambed alteration agreements. These agreements usually include specific requirements related to construction techniques and remedial and compensatory measures to mitigate adverse impacts. CDFG also may require long-term monitoring as part of an agreement to assess the effectiveness of the proposed mitigation. SBCFC&WCD will obtain a Streambed Alteration Agreement prior to the initiation of project construction and, therefore, the project will comply with the Code.

Surface Mining and Reclamation Act of 1975 (SMARA) (Cal. Pub. Res. Code § 2710). This Act requires the state geologist to classify, solely on the basis of geologic factors and without regard to existing land use and ownership, the areas identified by the Office of Planning and Research, and other specified areas, as one of the following: (1) areas containing little or no mineral deposits; (2) areas containing significant mineral deposits; and, (3) areas containing mineral deposits, the significance of which requires further evaluation. The California Department of Conservation, Division of Mines and Geology (CDMG) has subsequently divided the above categories into Mineral Resource Zones. The project has complied with this Act and would not significantly impact mineral deposits. The project purpose is flood control, and it is not a mining activity. It is not subject to SMARA.

LOCAL:

1.6.1 The City of Santa Barbara General Plan and Local Coastal Plan Goals and Policies:

The City of Santa Barbara follows the guidelines provided in its General Plan and Local Coastal Plan Goals and Policies for evaluation of environmental resources. In addition, the City uses a Master Environmental Assessment prepared for all property in the City to assist in the determination of potential impact. For each resource, the City has established its own policies and goals to preserve the environment. The City of Santa Barbara is a Charter City which means that, instead of following all of the general rules established by the State for cities, the City has

elected to establish its own set of rules to the degree allowed by State law. The Charter was established by a public vote. Amendments to the Charter are also subject to approval by a vote of the citizens of Santa Barbara. Section 4 of this EIS/EIR provides details on applicability of goals and policies for each environmental resource.

1.7 AGENCY/ORGANIZATION COORDINATION:

1.7.1 Lead and Cooperating Agencies:

The USACOE is the lead agency for NEPA and the City of Santa Barbara is the lead/responsible agency for CEQA (as agreed to by the City and County of Santa Barbara). The EIS/EIR is prepared as a joint document. The proposed project will be cost shared with the local sponsor, Santa Barbara County. Therefore, the document is prepared in compliance with NEPA and CEQA regulations.

1.7.2 Coordination for Draft and Final EIS/EIR:

The proposed project was coordinated with the concerned resource agencies during preparation of the Draft and Final EIS/EIR to ensure that the proposed project complies with the requirements of the applicable laws and regulations. The correspondence with the agencies is located in Appendix J of the EIS/EIR. A summary of coordination is provided in the following paragraphs.

U.S. Fish & Wildlife Service (USFWS):

Informal discussions with USFWS began late in the fall of 1997. Conversations ranged widely over suitability of habitat along Lower Mission Creek for amphibians, benthic invertebrates, riparian species which form both major structural layers in the riparian plant community, historic occurrences of steelhead in Mission Creek, and the nature of spawning areas and feeding areas used by tidewater gobies. More involved coordination included participation by USFWS at the F4 conference held in April 1999 and the Alternative Formulation Briefing (AFB) in August 1999, including three site visits in the spring of 1999. During one of the field excursions, biologists from USFWS and the USACOE studied examples of eroded stream banks stabilized by riprap and planted in native vegetation. The other two trips involved surveying the entire route of Mission Creek for biological species by walking in it from Canon Perdido Street to Cabrillo Boulevard. Biologists from both agencies, USFWS and NMFS, studied the proposed location and design of structural features to mitigate for impacts to tidewater gobies, water velocity profiles, and the lack of sediment deposition in the estuary. That meeting occurred on site and was intended to refine the placement and design of features which will improve goby habitat in the estuary.

The USACOE has performed a modified Habitat Evaluation Procedure (HEP) to evaluate project related loss of habitat. Calculations in that HEP indicate that specific design features which the Preferred Alternative embodies will yield greater habitat quality compared with future projections if no flood control project were implemented, including the need for annual future maintenance for the life of the project. Conclusions of that HEP have been discussed at length with the USFWS.

R The Draft EIS/EIR was provided to the USFWS for their review during the public review period. A comment letter received from the Department of Interior is located in Appendix K. The USACOE coordinated the modification of the proposed project design, and related changes with the USFWS. On June 7, 2000, the USFWS participated in a meeting with the NMFS via telephone to discuss project design and mitigation features to minimize impacts to the steelhead and tidewater gobies. Subsequent to that meeting, on June 21, 2000, the USACOE provided a revised biological assessment, mitigation monitoring plan, revised project description, hydraulic/engineering analysis, biological assessment for steelhead and project plan. After receipt of the revised biological assessment and supporting information, the USFWS stated that to determine the project related impacts to tidewater gobies, they need additional project specific information.

National Marine Fisheries Service (NMFS):

Starting in January 1998, the USACOE began informal discussions with NMFS regarding many aspects of the life history of steelhead in southern California. These discussions have included, but not been limited to, the fidelity of individuals (and hence their genes) to the stream in which they were spawned, the history of stocking coastal streams with fish derived from hatchery stock, the genetic ambiguity of fish as judged by their phenotypic appearance at different stages of their life cycle, the mal-adaption of hatchery trout to survive ocean conditions, and the stimuli which prompt adult steelhead to swim up streams and young steelhead (also known as smolts) to swim down. NMFS regards Mission Creek as a potentially significant migratory corridor for steelhead, despite the general effects of urban development in Santa Barbara. NMFS participated in the F4 conference held in April 1999. A biologist from NMFS participated in one of the field excursions along Mission Creek in May 1999.

Informal discussions with NMFS have dwelt on the physical arrangement of the oxbow bypass culvert and the properties of water flowing through it. This design element of some flood control alternatives should not affect migrating steelhead, either adults or smolts. Water velocities and depths within this structure were a central matter in Section 7 Consultations between NMFS and USACOE.

R A biological assessment was provided to the NMFS with the Draft EIS/EIR in December 1999. The project design was modified after release of the Draft EIS/EIR due to hydraulic/engineering and real estate constraints. The culvert length was increased from the original design. Therefore, the NMFS raised some concerns to determine project related impacts to steelhead. Extensive coordination occurred with their staff to provide satisfactory information. By letter dated March 21, 2000, the NMFS requested of information to analyze project related impacts to steelhead (see Appendix J). They requested detailed project design, cross sections and longitudinal profiles of stream channel throughout the project area, detailed hydraulic analysis, velocity and depths of water within the low flow channel and culvert, scheduling/timing of construction, maintenance procedures, and a detail monitoring plan.

Since the receipt of the request from the NMFS, the USACOE performed numerous hydraulic/engineering analyses to design the weir to maintain the desired water flow through the oxbow to avoid impacts to migration of steelhead through the constructed channel. The USACOE developed additional structural mitigation features to minimize impacts to steelhead and tidewater gobies. On June 7, 2000, the USACOE staff met with NMFS staff at their office.

Mr. Jon Mann (hydrologist) participated in a video conference call and the City staff and USFWS participated via telephone in this meeting. The USACOE provided a brief summary of the modified project design, water velocity within the channel, length, height and location of weir, how a weir would guarantee a minimum flow of 640 cfs through the existing oxbow channel, and implementation of other mitigation features to minimize impacts to steelhead and gobies. Both agencies worked together to achieve a common goal to minimize impacts to steelhead. The USACOE incorporated their recommendations to a maximum extent possible in the project design.

At this meeting, the NMFS stated that minimal daily flow, sediment budget, existing water surface profiles, longitudinal profiles of the creek bed and representative cross-sections of the stream need to be considered in project design. Agreement was reached that a 2.3 year level of flow, equal to about 640 cfs, should pass through the low flow channel. Mitigation features to ensure this flow level and other structural features to be implemented to minimize impacts to steelhead were discussed. The NMFS agreed with the proposed mitigation structural features to minimize impacts to steelhead (see details in biological assessment of steelhead). The USACOE agreed to provide all required detailed hydraulic/engineering analysis, design plan, revised biological assessment, and revised project description by the middle of July 2000. On July 16, 2000, the USACOE provided a revised biological assessment with the supporting information, including revised project description, hydraulic/engineering analysis, mitigation monitoring plan, shade study, revised biological assessment for steelhead, and project plan. The NMFS provided a Final Biological Opinion on August 2, 2000 (see Appendix B).

U.S. Army Corps of Engineers Regulatory Branch:

The Environmental Resources Branch (ERB) initiated coordination with the USACOE Regulatory Branch in March 1999. The Regulatory staff participated in the F-4 conference meeting. A copy of the F-4 package was provided to Regulatory Branch (Ventura Field Office) for their review. Regulatory staff participated in both meetings, the F4 conference and the AFB.

R The Regulatory branch received an application from the local sponsor to obtain a Section 404 USACOE Regulatory permit (December 20, 1999, Appendix E-1). Regulatory Branch requested a detailed mitigation monitoring plan identifying goals, success criteria and monitoring of the planted vegetation and other biological resources. The Environmental Resources Branch (ERB) prepared a detailed mitigation monitoring plan and on June 22, 2000, revised information including: revised project description, mitigation monitoring plan, revised biological assessments and hydraulic/engineering analysis and project plans and drawings were provided for their information. The ERB staff will coordinate with the Regulatory Branch of waiver of the Section 404 Water Quality permit under Section 404 (r) regulation.

California Regional Water Quality Control Board (CRWQCB):

On August 17, 1999, the USACOE called CRWQCB staff to inform them the proposed Lower Mission Creek Flood Control Project. Mr. Higgins stated that their concerns would be the restoration of riparian vegetation in the stream, which provides benefits to water quality and improves the environment for steelhead. The CRWQCB would tend to defer to USFWS and NMFS on these issues. The CRWQCB's major goal is improvement of the environmental conditions along Lower Mission Creek. The USACOE invited the CRWQCB to participate in

the AFB meeting. Mr. Higgins could not attend the meeting.

On November 9, 1999, the USACOE staff informed CRWQCB that the proposed project construction would be exempted under Section 404(r) regulations. The guideline of 404 (r) has been provided to the CRWQCB staff via e-mail for their information.

R On December 20, 1999, the USACOE and the Santa Barbara County Flood Control District submitted a request for a waiver from the Section 401 Water Quality Certification (Appendix E-1) for the proposed project. Future maintenance is a part of the project. Impacts related to future maintenance for the life of the project are included in the EIS/EIR. By letter dated February 2, 2000, the CRWQCB provided a waiver from the Section 401 Water Quality Certification for the project construction and the future maintenance (Appendix E-1). On June 21, 2000, the USACOE provided a revised project description, hydraulics/engineering analysis, biological assessments, and mitigation monitoring plan to CRWQCB for their information. The revised project description did not change impacts to waters of the United States. Therefore, waiver of the Section 401 Water Quality Certification remains in effect.

California Department of Fish and Game (CDFG):

Many informal discussions with CDFG regarding steelhead in Lower Mission Creek have occurred since December 1997. These exchanges centered on details of physiology, historic distribution, fidelity to natal streams, frequency of recognizable genetic stocks of steelhead in southern California streams, and the appearance above the project area of trout with every feature of steelhead after the El Niño rains of 1998. Streambed conditions which favor migration up and down coastal streams have been a significant element of discussions and considerations, as well. Following discovery of a pair of steelhead spawning within the project area and numerous malts at Oak Park and other lower sections of the creek in the spring of 2000, further discussions about stream heterogeneity took place. These focus on the benefits of a pilot channel, fish ledges, and side baffles as ways to improve conditions during steelhead migration.

California Coastal Commission:

On November 18, 1999, the USACOE initiated coordination with the California Coastal Commission (CCC) staff (Mr. Jim Raives) of the proposed project. Mr. Jim Raives stated that the proposed project would require a Coastal Consistency Determination (CCD). Informally, the CCD was provided to the CCC for their review and recommendations during preparation of the Draft EIS/EIR.

R On December 20, 1999, the USACOE submitted a CCD with project description, HEP analysis report, biological assessments, and Draft Coordination Act Report to CCC. Since submittal of the CCD, extensive coordination has occurred between USACOE, City of Santa Barbara and CCC staff. The CCC staff expressed their concerns for the project design, and required detailed project plans to examine the project features. In addition, they were concerned about construction of vertical walls within the coastal zone, impacts to water quality, non-point source discharge degrading water quality of the creek, goals, success criteria for the planted vegetation, impacts to endangered species, estuarine habitat, mitigation, sand supply, HEP analysis, visual resources and cultural resources. The CCC also desired to have biological opinions from both agencies, USFWS and NMFS, to make their determination. The CCC

recommended that the USACOE examine an alternative with vegetated riprap slope or a full vegetated riprap bank below the freeway. The USACOE performed a cursory economic analysis of these alternatives. Results of this conceptual analysis can be found in the Economic Appendix. These alternatives are not economically feasible.

A staff report for the proposed project was prepared in January 2000, and a Draft copy was provided to the USACOE for review. Since then the staff report was revised in July 2000. The USACOE provided response or input formally or informally since January 2000. On June 21, 2000, the USACOE provided revised project description, mitigation monitoring plan, revised biological assessments (steelhead and goby), hydraulics/engineering analysis, and supporting project plans and drawing. The CCC staff again felt that there was not enough information to make their determination and recommendation for the proposed project implementation. The USACOE requested postponement of the public hearing on the proposed project until the biological opinion is received from the USFWS. The CCC staff provided recommendations to incorporate in the project design to minimize impacts to environmental resources. The USACOE will revise the CCD and submit it again to the CCC for their consideration with the biological opinion.

The City of Santa Barbara provided a letter (February 22, 2000, Appendix J) to respond to some of concerns on construction of vertical walls between Yanonali and State Streets, and aesthetics of the coastal zone. The City identified the possibility of using Redevelopment Agency Funds to improve esthetic resources of the coastal zone within the project area.

R **State Historic Preservation Officer (SHPO):** Consultation with the SHPO toward Section 106 compliance was completed with receipt of their letter dated August 3, 2000. They concurred with our determinations of eligibility and non-eligibility for the various buildings and structures in the APE. Some structures and both neighborhoods were determined not to be eligible for inclusion on the National Register of Historic Places. They also concurred with our determination that the project as planned will have no adverse effect on properties that are eligible for inclusion or, are included in the National Register of Historic Places. The project complies with Section 106.

Santa Barbara County Air Pollution Control District:

Ms. Vijaya Jammalamadaka, Air Quality Specialist, was consulted on November 16, 1999, regarding the proposed project. Ms. Jammalamadaka provided USACOE with the latest Air Quality Sections of their Environmental Document via e-mail. As stated within the document and reiterated by Ms. Jammalamadaka, quantitative thresholds of significance are not currently in place for short-term construction emissions. She requested that a worst case calculation be performed and to use 25 tons per year as a threshold value for each pollutant to compare project related emission.

R **Environmental Defense Center:**

On July 31, 2000, the USACOE and the City of Santa Barbara met with Mr. Brian Trautwein of the Environmental Defense Center (EDC), Mr. Eddie Harris of the Urban Creeks Council and Ms. Kendy Radasky of the Santa Barbara Audubon Society to discuss their concerns and modifications of the mitigation measures. The concerns discussed at this meeting included, were

not limited to, use of vertical walls, loss of streambed habitat, creating a pilot channel (bankfull channel), cleanup of contaminated sites along the creek bank, removal avoidance of vegetation in bankfull channel, planting riparian vegetation should be closer than identified in the EIS/EIR, use of black cottonwood instead of Fremont cottonwood, and fish passage improvements in the Caltrans channel. The USACOE and the City provided a brief summary of the revised mitigation measures, how impacts would be minimized to the listed species and aquatic habitat. Revised Biological Assessments, Mitigation Monitoring Plan, Revised Project Description and Hydraulic/Engineering Analysis were provided to EDC staff for their information.

SECTION - 2 - NEED FOR AND OBJECTIVES OF ACTION

2.1 STUDY AUTHORITY:

The Lower Mission Creek Flood Control Project is authorized under Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), which reads in parts as follows:

"Sec. 209. The secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes,... to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the following named localities [including]:

All Streams in Santa Barbara County, California, draining the Santa Ynez Mountains, except Santa Ynez River and tributaries."

2.2 NEED FOR THE PROJECT:

Mission Creek, especially downstream from Carrillo Street, poses a serious flood threat to the City. In this area, a mix of residential, commercial, and public properties is subject to major damages during floods. Therefore, in partial response to Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), the USACOE and the City of Santa Barbara are preparing the following report to address flood control and associated problems for lower Mission Creek. In addition, alternative solutions and recommendations to solve the flood and associated problems are included with consideration of economic, environmental and social needs of the area.

As the recent flooding shows, the same storms today result in more floodwaters because of urbanization of the lower watershed and flood plain, and light to moderate development of the middle watershed. More pavement, roofs, concrete and drains in both the middle and lower drainage areas have greatly increased the potential for substantial runoff since the early 1900's. Despite current setback requirements, more residual encroachment remains than during the early 1900's. Many bridges and channels still have very limited capacities; several can pass only storm flows with occurrence frequencies of less than two to ten years.

The rainfalls that cause flooding in the Santa Barbara area are intense, local storms typical of the south coastal area. These floods are of a short duration, with extreme flooding

lasting a few hours or less. Past floods in the cities and communities of Santa Barbara, Goleta, Montecito and Carpinteria have demonstrated that localized storms can cause substantial damages in one area while completely bypassing another.

During each flood, material deposits in the creek bed. Debris comprises mostly boulders, cobbles, stones, sediment, brush and trees washed from the upper watershed area and from the narrow canyon section above State Street. Upon reaching the flatter slopes downstream from State Street, the debris deposits in the channel, obstructs flow and causes sediment-laden waters to flood the adjoining properties.

Past Flooding History: Historical records of floods along Mission Creek date back to 1862. Most historical data is qualitative; very little quantitative data is available. Records since 1900 show that floods occurred in the south coast of Santa Barbara County in 1906, 1907, 1909, 1911, 1914, 1918, 1938, 1941, 1943, 1952, 1955, 1958, 1962, 1964, 1967, 1969, 1973, 1978, 1980, 1983, 1995 and 1998. Increasing urbanization of the watershed during the historical period has undoubtedly contributed to increased run-off. Continuous records of peak discharges are only available for the last 24 years. A stream gaging station was established on Mission Creek in October 1971. A stream gage was established in 1941 on San Jose Creek, draining a similarly sized watershed ten miles to the west of Mission Creek. Flood damage surveys have been conducted since 1969, but even these surveys were not complete for several of the floods. Prior to 1969, the records are mostly from newspaper accounts, field investigations and eyewitness accounts (see details on past history in main report).

The Following Paragraphs Briefly Describe the Flooding History from 1952 to Recent:

January 1952: During 1952, due to heavy rain, the project area was flooded several times. About 50 homes were flooded during this period. Nearly all the bridges were blocked during the peak of the storm as water was two to three feet over many of the bridges. The bridges were saved by crews removing debris. Floodwaters entered homes in the Haley and De la Vina Street area. A house and two garages near Gutierrez Street were washed away. Many bridges were barricaded because of threatening floodwaters including the De la Vina Street bridge near Alamar Avenue.

November 1964: During this storm, the Montecito area was flooded. During the flood, boulders moved down the stream beds and, together with residue and debris, plugged bridges and obliterated stream channels, causing mud flows over several residential areas. The emergency work prevented substantial additional damages. Very minor damages were reported along Mission Creek; clearing of the channel and some bank protection work was needed.

January 1967: The 1967 flood caused moderate to major damages along the lower reaches of Mission Creek, from the Haley Street bridge, about a quarter mile upstream of U.S. Highway 101, to the Pacific Ocean. The major flood damages occurred along a reach just downstream from Haley Street where many residential and commercial establishments were damaged by debris-laden waters. Considerable debris was deposited on the streets and along the Southern Pacific railroad.

January 1969: The January 1969 flood caused only limited damages along Mission Creek. Heavy debris flows blocked bridges and obliterated streams in the foothill areas. About 100 homes in the Montecito area and 250 homes and 21 commercial establishments in the Carpinteria area were damaged.

February-March 1978: During this year, the U.S. Highway 101 crossing flooded and around 50 structures were damaged; damages were limited by the fact that most of the houses are elevated a few feet above grade.

February 1980: The February 1980 flood along Mission Creek required channel repair at a cost of $241,500 (1995 dollars). Houses between Cota Street and Cottage Avenue on De la Vina Street were flooded. Among the bridges overtopped were the Haley and Chapala Street bridges.

1983: The 1983 floods along lower Mission Creek caused erosion to the banks from Ortega to Haley Streets. Emergency rip-rap was placed along the channel to protect several threatened houses. The Mason Street bridge blocked and diverted flood waters away from the creek along Mason Street.

January 1995: During this flood, a narrow strip of the residential area along the creek above Highway 101, as well as most of the floodplain between Highway 101 and the Pacific Ocean were flooded. January 10th eight hour duration rainfall totals for the gauges near the Mission Creek drainage area show a range of values from a low of 5.59 inches to a high of 7.42 inches.

1998: In 1998, during the storm season, Mission Creek overflowed its banks near the railroad tracks, resulting in localized flooding at the railroad station and along Lower State Street. No major damage occurred during this flooding event. See details in Main Report Section III.

2.3 PLANNING OBJECTIVES:

The objective of this study is to analyze the flooding and associated problems along Lower Mission Creek, to consider alternative solutions to flooding and associated problems, and

to recommend, for implementation, a solution to these problems. In development of alternatives, consideration has been given to the economic, environmental, and social needs of the study area. The Federal objective of water and related land resources planning is to contribute to national economic development consistent with protecting the nation's environment, pursuant to national environmental statutes, applicable executive orders and other Federal planning requirements.

Economic Criteria: The general economic criteria applied in formulating and comparing alternatives are summarized below:

- Tangible project benefits must exceed economic costs. The benefit-to-cost (B/C) ratio is a measure of this criterion. The B/C ratio must exceed 1:1 to achieve economic justification. Benefits generally include reduced damage to public and private property and reduced flood insurance costs for properties no longer in the flood plain.

Environmental and other Criteria: Principles and guidelines further provide that environmental quality, social well-being, and regional development should be taken into account, as well as national economic values. The plan that makes the greatest possible contribution to the natural environment is called the environmental quality (EQ) plan. The following environmental criteria were considered in development of the alternatives.

- Potential impacts associated with the proposed action will be fully evaluated. Resource categories that will be analyzed are: land use, physical environment, geology, biology, agriculture, air quality, water quality, groundwater, recreational usage, aesthetics, cultural resources, transportation/communications, hazardous waste, socioeconomics and safety.

- Each alternative shall be evaluated as to its potential impact, either beneficial or adverse. Significant resources located within the project area need to be identified. The relationship between short-term uses and long-term productivity of impacted resources needs to be determined. Irreversible and irretrievable commitments of resources shall be identified.

- Analyze project related impacts to each resource. If the impacts to the resources are adverse or impacts could be unavoidable, provide feasible mitigation measures to minimize project related impacts.

- Consideration shall be given to public health, safety, and social well being, including the loss of life.

2.4 PUBLIC PARTICIPATION:

Public participation is especially important to environmental analysis by providing assistance in defining the scope of analysis in the EIS/EIR; identifying significant environmental issues and impact analysis in the EIS/EIR. Participation of affected Federal, State, and local resource agencies, Native American groups and concerned interest groups/individuals is encouraged in the scoping process. Public participation is initiated by providing a Notice of Intent and Notice of Preparation of the EIS/EIR. Details are provided in the following paragraphs.

2.4.1 Notice of Intent/Notice of Preparation:

This environmental document is prepared in compliance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). This is a joint Environmental Impact Statement and Environmental Impact Report (EIS/EIR). The USACOE is a Federal agency; therefore, the document is prepared in compliance with NEPA. A Notice of Intent (NOI) was prepared to announce preparation of an Environmental Impact Statement (EIS). The NOI was published in the Federal Register on October 13, 1998 (Appendix I). Santa Barbara County and the City of Santa Barbara are the co-lead agencies for CEQA. Therefore, a Notice of Preparation (NOP) was prepared by the City of Santa Barbara. The NOP was published in the Santa Barbara News-Press on October 13, 1998. An Initial Study was also prepared for the project to determine the potential environmental effects to be studied in the EIS/EIR. The information contained in the Initial Study is consistent with the Corps' and Santa Barbara County Flood Control District's decision to prepare a comprehensive EIS/EIR. The Initial Study was distributed to the agencies, environmental groups and interested public. Copies of the NOI, NOP, and Initial Study are included in Appendix I.

The NOI and NOP provide formal notification to all federal, state, and local agencies involved with funding or approval of the project, and to other interested organizations and members of the public, that an EIS/EIR will be prepared for the project. The NOI and NOP are intended to encourage interagency communication concerning the proposed project and provide sufficient background information about the proposed project so that agencies, organizations, and individuals can respond with specific comments and questions on the scope and content of the EIS/EIR.

2.4.2 Summary of Public Workshop and Scoping Meeting:

Public Workshop: Prior to the public scoping meeting, a public workshop was conducted on August 28, 1997, by the U.S. Army Corps of Engineers (USACOE), the Santa Barbara County

Flood Control District (SBCF&WCD) and the City of Santa Barbara to provide an update on the progress of the Lower Mission Creek Feasibility study to the public of the Santa Barbara area. The purpose of the workshop was to provide an opportunity to the residents to discuss their concerns about flooding, the environment, potential solutions, and issues related to project costs and funding. The Workshop notice was provided in the Santa Barbara News Press on Sunday, August 17, 1997. A Summary of the public concerns expressed at that meeting are identified below:

Public Concerns Expressed at August 28. 1997, Workshop:

- Plan to coordinate with Waterfront project which is on going
- Coordinate with the concerned environmental groups.
- Provide maximum flood protection, about 5,800 cfs, minimum 35 years of flood protection.
- Clean up the lagoon; include as a part of the study. Improve water quality at lagoon.
- Storm drains were blocked and the street got flooded, Evaluation of storm water permit, what will be project impact.
- Chapala Bridge should not be replaced; railroad crossing is closed so there is no use replacing bridge.
- Soft bottom channel.
- No vertical walls.
- Protect the resources.
- Steelhead trout is listed and runs through the creek.

Public concerns received during the Public Workshop were taken into consideration in the development of the alternatives. These concerns were similar in nature to the concerns received during the public scoping meeting. Responses to these concerns are found in the subsequent section on the public scoping meeting.

2.4.3 **Public Scoping Meeting on Initiation of EIS/EIR**: On October 29, 1998, the Los Angeles District, U.S. Army Corps of Engineers, and the City of Santa Barbara Planning Commission hosted a public scoping meeting at the City Council Chambers, Santa Barbara, to obtain agency and community views and concerns. The concerns expressed at the meeting included the need to consider a variety of alternatives; the need to address biological resources including such sensitive species as steelhead and the tidewater goby; the need to consider potential impacts to air quality, water quality, aesthetics, safety, and cultural resources; and the need to comply with both the National Environmental Policy Act and the California Environmental Quality Act. All of these concerns have been addressed during project planning and preparation of the EIS/EIR. List of comment letters received from the public during the scoping process are located in Appendix I-1 of the EIS/EIR (letters are on file at USACOE,

Los Angeles District and City of santa Barbara). Concerns identified by the public on August 28, 1997, were similar to the concerns raised at the public scoping meeting for the EIS/EIR.

Summary of the public concerns received for the proposed project are presented below:

Concerns-Project Design:

- Project design should incorporate flood control, restoration of wetland and riparian habitat, improvement of water quality, visual/aesthetic resources and socioeconomics.
- Carrying capacity of the bridges should be evaluated.
- Many people expressed support for the plan as adopted by the Consensus Group (1994) and encourage the Corps to consider ways of implementing it.
- Some people suggested building on the 1994 consensus; that is, using it as a starting point for the project design.
- No use of concrete
- Divert excess flows to Arroyo Burro Creek
- Increase stream capacity from upper De la Vina to ocean.
- Prefer environmentally friendly plan.
- Wider channel will reduce area available for riparian buffer zone and recreation activities, and would impact water quality. Wider channel will be more expensive.

Response- Project Design: During plan formulation, the USACOE and SBCF&WCD and the City of Santa Barbara had several meetings to develop alternatives. The public concerns and plans identified by the Consensus Group were incorporated to the maximum extent in plan formulation. Use of concrete has been minimized, the creek bottom would be natural, with upper sideslopes stabilized with riprap plated with native, riparian vegetation. The tentative Recommended alternative is the environmentally superior plan compared to all other alternatives. In the future, this alternative will provide maximum biological values and quality and quantity of habitat compared to other feasible alternatives. This alternative provides incidental environmental benefits by planting native and riparian type habitat along the riprap banks, habitat expansion zones and construction of wetlands. For details, please refer Section 3.0 of the EIS/EIR and the Plan Formulation Section in the Main Report.

The USACOE performed hydraulic modeling of 5,800 cfs conveyance capacity. In order to obtain the required capacity, a greater invert width would be required. In addition, the bypass would be expanded to a triple 8 foot by 16 foot box culvert. It was determined that 5,800 cfs

conveyance was not feasible due to bridge constraints at Bath Street, State Street, and Cabrillo Boulevard Bridges. Replacement of these bridges was considered; however, due to their location, replacement of the bridges was not economically feasible. In addition, more real estate would need to be purchased in order to construct this alternative. The added costs of replacing these bridges and acquiring additional real estate would likely yield a benefit cost ratio less than 1:1; therefore, this alternative has been eliminated from further consideration.

Concerns - A Concrete vs. a Natural Channel Downstream of Highway 101:

- Sideslope stabilization with vegetated banks below U.S. 101.
- Strong opposition to construction of concrete/vertical walls; if vertical walls are necessary, incorporate aesthetic treatment, rough surface, sandstone with planting vegetation, creation of planting pockets.
- Public safety, in regard to the ability of people to get out of the creek if they fall in; and alternative methods of bank stabilization.
- Consider alternative methods of bank stabilization.

Response - A Concrete vs. a Natural Channel Downstream of Highway 101: See response above. Below Highway 101, there is limited opportunity to apply the combination of vegetated riprap and short wall protection due to close proximity of residential and commercial structures. In addition, such a design would result in the loss of several important historic structures. Due to the real estate and economic constraints, use of vegetated slopes within this project reach is not feasible except in two areas on the easterly bank up and downstream of Mason Street. See details in Main Report, Section IV, Plan Formulation and Section V of the Selected Plan.

Concerns - The Buried Culvert at the "Oxbow." Issues include its effect on:

- Construction of culvert from Gutierrez Street to Yanonali Street would have adverse/significant impacts on the landmark Morton Bay Fig Tree.
- Cleaning out culvert would be difficult and costly.
- Clogged culvert would cause flooding; who would be responsible for cleaning?
- Safety issue: criminals and homeless would live and hide in culvert.
- Impact on habitat, including steelhead migration.
- Historic sandstone retaining walls could be destroyed.
- Railroad operations will be disrupted during construction.

Response - The Buried Culvert at the "Oxbow": The box culvert would be constructed downslope from the tree and outside its dripline. Neither the trench needed to install it, nor the finished buried culvert itself would disrupt subsurface movement of water toward the tree's root system.. The reinforced box could actually function as a buried sill and cause a small accumulation of soil moisture on the side toward the tree. In consequence, the fig may have a readier source of water toward the southwest during dry times. No impact of any kind would occur to the Moreton Bay fig as a result of implementation of the project design. See details in Section 10.3 of the Biological Resources.

Fencing would be provided along the creek banks to prevent access by the public within the creek; therefore, the public would not have direct access to the culvert. Maintenance access by suitable equipment to clean culverts has been taken into consideration during design development. A railroad services detour would be provided during project construction; therefore, no disruption in services is anticipated. However, any unavoidable disruption would be very short-term and temporary. Sandstone walls along the railroad track will not be removed, but sandstone walls for the remaining reach below Chapala bridge may be removed to accommodate new bank protection.

Concerns - Erosion Problem:

- A few citizens voiced their concerns regarding bank erosion and losing properties, particularly at 123 W. Gutirrez Street.
- Consider other options for bank erosion control, such as those outlined in International Erosion Control Journal.

Response-Erosion Problem: The new bank protection is anticipated to prevent future erosion.

Concerns - Biological Resources:

- Evaluate project related impact to Steelhead.
- Project should not result in loss of wildlife habitat.
- Provide natural vegetated slope.
- Evaluate impacts to significant habitat, including vegetation supporting threatened, endangered, and other species.
- Provide buffer zone for riparian vegetation.

- Provide mitigation by habitat restoration; consider removal of debris for Steelhead migration; create pools and riffles.
- Consider removal of existing debris basins to reduce barriers to steelhead mitigation.
- Remove existing concrete channel bottoms to encourage fish passage and riparian eco-functions.

Response Biological Resources: Project related impacts to the biological resources, including the listed species such as Steelhead and Tidewater Goby, have been examined and analyzed in detail in Section 10.3 of the Biological Resources Section. Implementation of the proposed plan provides maximum environmental benefit compared to any other alternatives. The Habitat Evaluation Procedure has been performed to evaluate project related impacts to the biological resources. This analysis also identifies quality and quantity of the habitat to be impacted due to the construction of the project (see details in Appendix C of the EIS/EIR. Appropriate mitigation measures or environmental commitments are developed to avoid impacts to two endangered species of fish (steelhead and tidewater goby), including improvement of channel bottom by removing concrete, installation of energy dissipaters made from fields of protruding rocks, and abatement of giant reed (see details in Section 10.3 of the EIS/EIR). The project design incorporates maximum vegetation along riprap, habitat expansion zones and creation of wetland. The tentatively recommended plan provides maximum environmental benefit (see Section 3.5 of the EIS/EIR).

Concerns - Establishment and Protection of Wetlands:

- Issues include the effects of wetlands as bio-filters and habitat. Several people said this project should be considered a "riparian restoration project" rather than a flood control project.
- Dispersed wetlands work as well as large ones. Consider creating them in the channel, the floodplain, Laguna Channel, Sycamore Creek or the bird refuge. In addition, consider recreating a wetlands link between Mission Creek and Laguna Channel.

Response - Establishment and Protection of Wetlands: We looked at opportunities to create wetlands within the project reach (see details in Section 3.5 and 10.0 of the EIS/EIR). Restoration outside the project reach, or creation of wetlands outside of the project area, is beyond the scope of the study. Additional environmental restoration opportunities could be pursued under other Corps programs if requested and financial support is received from the non-federal sponsor. In addition, the City of Santa Barbara Redevelopment Agency has budgeted funds for a study of Waterfront Area wetlands restoration opportunities.

Concerns - Water Quality:

- Improve water quality, including creation of open, natural channels and eliminating concrete.
- Water quality, both in the creek and on ocean waters, is affected by natural bio-filters and temperature.
- Analyze pollution and contamination entering in the creek water.

Response - Water Quality: The proposed project design is to implement natural bottom channel and stabilization of the creek banks with a combination of short walls at the lower banks and vegetated riprap along the upper banks. In addition, about 15,000 sq. ft. of concrete bottom will be removed as part of this project. Upper banks are gentle and planting will allow filtration. Existing urban refuse would be removed. With implementation of sound environmental design, the existing water quality would be improved. Measuring pollution and contamination within the project reach has been initiated since 1995, and is still going on. The City of Santa Barbara is preparing plans to improve the water quality along Lower Mission Creek and reduce discharge of the pollutants or contamination in the creek (see details in Section 7 the EIS/EIR, Water Resources).

Concerns - Aesthetics:

- Provide as much green vegetation as possible; use native vegetation, sycamores etc.
- Bridge construction- use formally designed bridges and natural borders and sycamores.
- Existing sandstone walls would be destroyed due to implementation of the project.
- Consider aesthetics, as they affect people living along the creek, other local residents using areas near the creek, and tourists visiting the waterfront area.
- Many people recommend the removal of concrete already in place in areas of the creek.
- Concrete, textured to look like sandstone, should be used where vertical walls are unavoidable.
- Aesthetics in the area below U.S. 101, which serves as an entry to the City, are extremely important.
- Fences along the Creek are unsightly.
- Consider buying additional land along the creek for parks and pedestrian paths.

Response - Aesthetics: Improvement of the aesthetic resources has been considered in the development of the project design. Most of the upper slopes would be established by riprap and planted by native and riparian type of vegetation. Appropriate aesthetic treatment would be applied for the lower short-vertical-walls. The creek would have a natural bottom rather than concrete bottom and existing concrete bottom areas would be removed. Wherever the land is available, about five to six habitat expansion zones would be created, which would allow intrusion of the riparian type of vegetation beyond the creek banks. Compared to the existing conditions, the aesthetic values would be improved.

Concerns - Public Safety:

- Consider the possibility of homeless people living in the culvert.
- Vertical walls cause a safety concern because of people falling in and not being able to get out from the creek bed.

Response - Public Safety: The project design includes fencing at the top of the banks that will prevent access to the creek and culvert. Most of the creek banks would be stabilized with a combination of gentle vegetated riprap and short vertical walls, making it possible for people who fall in to get out.

Concerns - Socioeconomics:

- The issue is the loss of moderate-income housing stock as a result of creek widening.

Response - Socioeconomics: The USACOE will appraise the property prior to removal of the structures. The property owner will be compensated with that value. Existing tenants will be relocated. As redesigned, fewer units will be demolished than indicated in the Draft EIS/EIR. The number of structures lost has dropped from 14 to 10.

Concerns - Cultural Resources:

- Issues include protection of historic and Native American resources.
- Resurvey the project area, particularly north of the freeway, for cultural resources.
- Section 106 requires full environmental disclosure of impacts to historic resources. Mitigation must apply to both the interior and exterior.

- Consider the loss of historic structures immediately adjacent to the Creek.

Response - Cultural Resources: The City of Santa Barbara has awarded a contract to conduct an updated survey of the affected built environment in the Area of Potential Effects (APE). The survey report recommended structures which should be determined eligible for National Register, California Register and/or local listing. Mitigation of adversely affected historic properties may consist of historic retrieving data of the eligible historic properties, possible relocation of important houses, adaptive reuse of the Mission Creek Diversion and reconstruction or avoidance of the Chapala Street Bridge. Distinctive architectural features or elements from historic properties that are scheduled for removal will be reused where possible. A stipulation in the Memorandum of Agreement, if needed, will dictate the level of mitigation of Native American materials if any are discovered during ground disturbing activities. Archaeological and Native American monitors will be on-site during all ground disturbing activities to ensure that if any Native American materials or deposits are discovered, the Corps of Engineers and the City of Santa Barbara will be notified immediately.

Concerns - Cost-Benefit Analysis:

- Issues include what items are included in the analysis and how a cost-benefit ratio is calculated. Include beach closure, water pollution, maintenance, the need for buffer zones along the creek, prevention of sedimentation and pollution and natural and recreation values.

Response- Cost-Benefit Analysis: Those issues have been taken into consideration during the plan formulation process. However, the formal cost benefit analysis required for USACOE projects does not allow for consideration of values that do not have a direct economic benefit.

Concerns - Maintenance:

- Provide a detailed maintenance plan in the EIS/EIR.

Response - Maintenance: Detailed future maintenance activity description has been developed and included in Section 3.5 of the EIS/EIR. It has been further expanded upon in a new draft Maintenance Plan prepared by the County, with assistance by Ann Riley, a respected creek restoration expert.

Concerns - Growth Inducement:

- Recognize the potential for future development on creek.

Response - Growth Inducement: Future development in the project area is expected to consist of intensifying existing development on those residentially zoned properties that have remaining development potential. Privately owned vacant parcels will also be expected to have development on their sites in the long term. Redevelopment of commercial properties will be expected to occur in the Waterfront Area as the economy allows. Development of additional square footage for non-residential properties is limited by the City Charter, General Plan and Zoning Ordinance to 3,000 square feet per parcel, in most circumstances. Very few, if any, changes are expected in the amount and timing of development expected to occur on the creek.

Concerns - Historical Natural Drainage Patterns and Modifications within the Watershed: The Environmental Protection Agency (EPA) expressed their concern regarding complete analysis and documentation of the historical natural drainage patterns and modifications within the watershed, including rainfall quantities, groundwater discharges, dams, reservoirs, and imported water discharge. Letter dated October 23, 1998 is located in Appendix J.

Response - Historical Natural Drainage Patterns and Modifications within the Watershed: The USACOE has conducted a "Debris Deposition Study for without-project and with project conditions, Santa Barbara County Streams, Mission Creek/Rattle Snake Creek, Santa Barbara County", September 1984. The study consisted of a qualitative evaluation of the watersheds, including collection and evaluation of available historical data to determine the hydrological and debris flow characteristics of the watersheds. A qualitative analysis was then performed to estimate the quantities of debris produced during various return period events. The effect of fires on debris production quantities was considered in the analysis. Debris flow and sediment yield quantities were estimated at each of the two existing debris basins on Mission and Rattlesnake Creeks. The report also included flood and sediment erosion history, sediment yield analysis, sediment size and distribution, annual sediment yield, degradation/aggradation and type and amount of sediment. The USACOE conducts detailed hydrological and hydraulic studies for evaluation of flood control alternatives.

Additional study of the watershed would be out of the scope of this study. Watershed study could be performed under different USACOE authority, if the local sponsor is available to participate in the financial cost and project design.

Concerns - City of Santa Barbara General Plan and Local Coastal Plan (L.P.) Goals and Policies Consistency:

- The flood control plan must be consistent with all city general plan and local coastal plan goals and policies, State and Federal laws and California Coastal Act.
- Evaluation of each resource is needed in relation to the City of Santa Barbara's General and Local Coastal Plan and Policies.
- Evaluate the project against the Downtown/Waterfront Vision.

Response - City of Santa Barbara General Plan and Local Coastal Plan (L.P.) Goals and Policies Consistency: Section 4 of the EIS/EIR provides details on the City of Santa Barbara's General Plan and Policies for environmental resources. The General and Local Coastal Plan and Policies have been incorporated in the evaluation of each environmental resource. Sections 6 through 19 of the EIS/EIR provide evaluation of each environmental resource for the proposed project.

R 2.5 **PUBLIC REVIEW OF DRAFT EIS/EIR:**

The Draft EIS/EIR was provided for public review in December 1999. The Corps of Engineers filed copies of the EIS/EIR with the EPA on December 15, 1999. The Notice of the Availability (NOA) of the Draft EIS/EIR was published in the Federal Register on December 23, 1999. Copies of the Draft EIS/EIR were provided to California State Clearing House (SCH# 1998101061) for agency distribution in compliance with CEQA. The City of Santa Barbara published the NOA of the Draft EIS/EIR and public hearing in the local Newspaper. The Draft EIS/EIR was distributed to agencies and the public for 45-days public review (December 23, 1999 to February 7, 2000). Copies of the Draft EIS/EIR were made available at the public library for the public who wished to review the Draft EIS/EIR. The public hearing was conducted on January 19, 2000, at City Hall, City Council Chambers, Santa Barbara at 6:30 pm. to solicit the public's concerns on the Draft EIS/EIR. The public was informed by mailing Notices and publishing a notice in the local newspaper (Appendix I-1). A summary of the public comments received during the public hearing are included in the Appendix I-2 of the EIS/EIR. Comment letters received on the Draft EIS/EIR and responses are located in the Appendix K. In accordance with NEPA (Section 1503.4(b) and CEQA (Section 15088), the USACOE, Santa Barbara County and the City of Santa Barbara reviewed the comment letters; appropriate responses are provided in Appendix K of the EIS/EIR. The text in the EIS/EIR has been revised to reflect public comments/responses. The revised text is marked with letter "R" in the left margin. The project description/mitigation measures have been modified in response to

some the agencies/public comments. The following subsection summarizes public comments and brief responses. Lists of the comment letters is provided below.

R 2.5.1 **Summary of the Public Hearing and Brief Responses to Comments:**

The U.S. Army Corps of Engineers (Corps), the Santa Barbara County Flood Control District (Flood Control District), and the City of Santa Barbara (City) held a public meeting on Wednesday evening, January 19, 2000, 6:30 PM, to give the public an opportunity to comment orally on the Draft Feasibility Study and Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The public meeting was held in the Council Chambers at Santa Barbara City Hall located at De la Guerra Plaza.

DRAFT EIS/EIR - PUBLIC REVIEW
LIST OF COMMENT LETTERS

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1. United States Environmental Protection Agency
2. United States Department of the Interior
3. United States Coast Guard
4. California Governor's Office of Planning and Research, Clearinghouse
5. City of Santa Barbara Historic Landmarks Commission
6. City of Santa Barbara Architectural Board of Review
7. City of Santa Barbara Parks and Recreation Department
8. City of Santa Barbara Parks and Recreation Commission (see #7)
9. Justin Ruhge, Concerned Taxpayers of Santa Barbara County
10. Robert Bernstein, Santa Barbara Bicycle Coalition
11. Edward Cella, President, De la Guerra Homeowners Association
12. Darlene Charman, President, and Kendy Radasky, Santa Barbara Audubon Society
13. Richard A. Stromme, Railroad Advocates
14. Louise Boucher, Citizens Planning Association of Santa Barbara County
15. Eddie Harris, Urban Creeks Council
16. Maria Gordon, Small Wilderness Area Preserves, Inc.
17. Brian Trautwein, Environmental Defense Center
18. Gabrielle and Jerome Boucher
19. Lisa Ann Kelly and Family

20. David Dates
21. Jerome and Gabrielle Boucher
22. Eva Inbar
23. Gail Pearce O ' Brien
24. Dennis Hoey
25. Eduardo and Marite Gonzalez
26. Peter Gerlach
27. Antonio R. Romasanta, Harbor View Inn
28. Elihu M. Gevirtz
29. Lisa Torres
30. David Shelton and Alexandra C. Cole
31. Rita Gronhovd
32. Jana Zimmer
33. Kate Lundy
34. Teddy Gasser and Carlin Moyer
35. Charles I. Kline
36. Martin Landsfeld
37. J. D. Dale
38. John Poucher, Hollister and Brace, Attorneys at Law, for Jacques Partners
39. Francisco Zambelli

A verbatim transcript of public meeting proceedings from a videotape was prepared; the transcript is on file at USACOE, Los Angeles District Office. The following is a categorized compilation of questions, comments, and concerns raised at the public meeting. A brief response of how the comments have been addressed follows each of the topics.

(1) Concerns – Project Alternatives:

1-A: Add another plan: extend the box culvert from its current outlet point near the Chapala Street Bridge to the end of Mission Creek. If trees cannot be planted on top of the culvert, substitute other vegetation. *Response: At the request of the local Sponsors, the concept of extending the culvert down to State Street or Cabrillo Boulevard could be investigated during the PED phase as a design refinement. The feasibility of extending the box culvert has not undergone any engineering and environmental analyses at this*

time; thus, the Corps could not present an opinion on whether the longer culvert would be more advantageous compared to the current design or if it is at all feasible.

1-B: Increase both habitat and flood protection by buying more land along the corridor. Relegating the riparian corridor to two 10-foot strips in the pocket riparian zones with virtually nothing south of Highway 101 is inadequate. *Response: In our effort to balance the need for flood control improvements and environmental considerations while trying to minimize the impacts to adjacent properties, the bank protection was designed to have the sloped riprap begin halfway up the bank. Otherwise, a much wider sloping bank would be required if the entire bank is protected with riprap only. This would require numerous additional complete property acquisitions, which would result in significant additional cost and would render the project uneconomical in accordance with Federal requirements, consequently resulting in non-participation by the Corps to implement this flood control project.*

1-C: What are the differences between the channel width alternatives for the Mason Street area? Why is it important? *Response: The new channel is designed to convey stormwater flows up to 3400 cubic feet per second (3400 cfs) and will require that the channel be widened to 60 feet below Mason Street. The top of bank or top of wall for this design (60-ft wide) would generally follow the existing topography of the banks. An informal analysis performed to test the possibility of reducing the creek top width between 50 to 55 feet wide, while increasing the wall height several feet above the existing top of banks. Early indication points to the possibility of such design. During the Pre-construction Engineering and Design (PED) phase of the project, when additional detailed analysis will be performed, such design refinements to reduce the creek width would be considered.*

(2) Concerns – Project Design:

2-A Proposed acquisition of the property for an expanded habitat zone at the corner of the project at De la Guerra: recommend only using the slope as the expanded habitat zone in order to save the building. *Response: This design refinement requested by the City and the County has been incorporated in to the Recommended Plan.*

2-B Extend the vertical wall that is part of Ortega Bridge a short distance to save another dwelling. *(Kelly–City) Response: This design refinement requested by the City and the County has been incorporated in to the Recommended Plan.*

2-C Expand the landscaping behind the vertical wall at the Bath Street Bridge to allow vegetation to grow down and behind the wall. *Response: As part of City embellishment, some planting would be encouraged along the top of this vertical wall.*

2-D At Cota, slightly change the bridge alignment and perhaps extend the vertical wall a short distance to save the dwelling, which has some historic significance. *Response: This design refinement requested by the City and the County has been incorporated in to the Recommended Plan.*

2-E Reduce the capacity of the "sewer" lagoon by putting a portion of its capacity in a box culvert that would run down to the ocean or State Street. Might be able to clean up the lagoon better. Plant vegetation on both sides of the lagoon to create a canopy. Install a lighted walkway with trees and plants on top of the culvert. Response: See Response to comment 1-A.

2-F Build a box culvert in the De La Vina area, as well, and cover it. *Response: During the Reconnaissance phase of this study, a proposal to divert part of the stormwater flows upstream was eliminated from further consideration since it was found to cost more and the excavation required along the streets could result in significant cultural resource impacts. In addition, it would result in the creek mouth being 500 feet closer to the harbor mouth, resulting in greater siltation impacts to the Harbor. Earlier attempts by the USACOE to build a diversion structure were met with strong opposition, would have increased costs and, at the request of the City and County, the idea was abandoned.*

2-G Extend the box channel across the railroad yards: open it up, go straight, and make it really big (300 feet wide) by getting rid of the parking lot, and put the railroad on a trestle. *Response: Widening the oxbow or the culvert would be similar to Alternatives 4-7, which would be cost-ineffective and would not warrant Federal Participation.*

2-H Use pumps to pull the water out rapidly. Response: *The culverts that would be needed to convey the discharges from the pumps would have similar impacts as described in above.*

2-I Narrow State Street and Cabrillo Boulevard to give the creek more room to expand.

Response: Replacement of the State Street and Cabrillo Boulevard Bridges were not considered in this study due to the adverse economic impacts.

2-J Vertical walls should not extend all the way up to the estuary. *Response: As shown by Alternatives 5 and 9, where sloping banks (similar to the Consensus Group design) were applied, the additional cost of right-of-way acquisitions would render the project uneconomical and would not warrant Federal participation. As such, vertical walls would be used along this commercialized section of the project.*

2-K The design has too much concrete. *Response: The use of concrete in the structural components of the bank protection allows for a design that would minimize impacts to adjoining properties and allow planting on the riprap slope. The concrete will include aesthetic treatment so it will look like sandstone or other suitable materials as determined by the design subcommittee.*

(3) Concerns – The Buried Culvert at the "Oxbow":

3-A We need more information about how much excess flow this culvert will take away.

Response: Low discharges would continue to flow through the oxbow. The culvert would be designed to begin taking overflows at discharges higher than 640 cfs. The culvert would convey approximately two-thirds of the project conveyance design capacity. The USACOE has performed detailed hydraulic analysis , included a construction of weir to insure a minimum of 640 cfs level of flow would pass through oxbow at 2.3 year level of event. This design has been coordinated with the resource agencies, particularly with the National Marine Fisheries Service (see details in Section 3.5, project description).

3-B Is there any part of the design of the box culvert that could assist in reducing the water discharge energy at that point? (Planning Commissioner) *Response: The creekbed at the outlet of the culvert would be armored with riprap to act as an energy dissipater and prevent potential undermining of the adjacent structures.*

(4) Concerns – Flood Control:

4-A What type of protection will the project provide for floods that exceed the 20-year storm?

(Planning Commissioner) Response: This project (3400-cfs design) would result in reduction of flooding from higher but infrequent events. The residual effects of flooding from higher flows are shown on the inundation maps found near the end of the main

report. The map shows the reduction in flooding for the 50, 100, and 500-year floods before and after the project.

4-B If the capacity of the channel above the project area is 7,000 cfs, what is going to happen when we have a greater than 20-year storm? *Response: See response to preceding comment. Residual flooding would still occur during events greater that 3400 cfs. The residual flooding would be decreased incrementally by the increased capacity of the creek.*

4-C Is there a cutoff point from a cost-benefit standpoint? *(Planning Commissioner) Response: In order for this flood control project to warrant Federal interest, the B/C ratio has to be equal to or greater than 1:1.*

4-D The project should be redefined to accommodate 3,210 cubic feet per second (cfs), which is what the consensus group agreed to. This would narrow the channel a couple of feet, which is important. *Response: The Lower Mission Creek Feasibility Study Executive Committee directed the study team to focus on 3400 cfs as established by the bridge constraint; the conveyance capacity of the State Street Bridge. Also, the difference of 190 cfs between the alternatives would be insignificant during hydraulic design consideration.*

4-E What effect will increasing Mission Creek's capacity have on the area to the east of the project area? *Response: The annual expected damages for the Laguna Drainage Area would be reduced by about 27%, while the damages to the Lower Mission Creek Drainage area would be reduced by about 47%.*

4-F What would it take to give us greater capacity, either through some alternative channel or some alternative solution? *Response: Increasing the capacity while maintaining the natural bottom of the creek could be facilitated by replacing all existing bridges and acquiring additional properties along the entire creek to allow for a wider creek. However, the costs would be greater than the benefits, resulting in a project that is not economically feasible.*

(5) Concerns - Erosion Problems:

5-A Historically, flood water has washed out behind the vertical walls and taken away the bank. Isn't that still possible with the vertical walls in the project design? *(Planning Commissioner) Response: The proper sizes or grade of riprap would be used to prevent washing away of fill behind the walls.*

5-B We need more specific examples of what you're going to do to ensure that the earth doesn't wash away. Response: *See the preceding response. During the final design, more details would be made available for review.*

(6) Concerns - Biological Resources:

6-A Vertical walls on the sides of the estuary are not compatible with tidewater Goby habitat, which requires vegetated sloping banks. *Response: In existing conditions, the estuary between Mason Street and Cabrillo Boulevard has vegetated sloped banks only on the left side of the creek. Upstream of State Street, bout 275 linear feet could be described as sloped and vegetated banks. But Remaining banks in the estuary has artificial and vertical walls, either of wood, gabions, concrete or cemented sand banks.*

Structural features have now proposed as part of project design to mitigate effects on both tidewater gobies and steelhead. These features include ledges which project into the creek, rows of large rocks placed against the walls, and high-relief ribs formed into the wall's surface. (see Section 10 for details of their design, placement and purpose). The additional cost of right-of-way acquisitions would render the project economically infeasible.

6-B The area below Cabrillo Bridge is very important for tidewater Goby habitat and should be included in a comprehensive creek management plan. *Response: The presence of the Endangered Species in the lagoon limits the activities affecting this area for this flood control project. The City, as part of its larger Clean Water and Creek Restoration Program, would consider the appropriate management of the lagoon.*

6-C The channel bed will be a biological desert (because of silt removal and herbicide spraying), leaving only thin strips of vegetation along the banks—where there are banks. *Response: The mosaic removal of streambed vegetation would allow growth of non-obstructive vegetation while maintaining the flood control design capacity.*

6-D Widening the creek bed increases maintenance responsibilities, which has environmental impacts. The creek bed doesn't have high environmental values because of maintenance. The creek banks do, since they contain the habitat. They should be made wider by buying stream-side properties and further laying back the banks where there are proposed walls. Response: *See response to comment 2-J.*

6-E When was the last time a steelhead trout was caught in Mission Creek? *Response: Numerous sighting of steelhead have been recorded in the past, including sighting by the*

California Department of Fish and Game Staff. Sightings have been reported as recently as spring 2000

6-F The EIS/EIR should contain more details on the environmental impacts of flood control on estuary activity. *(Planning Commissioner) Response: The Biology Section of the EIS/EIR includes discussions on impacts to the estuary.*

6-G The EIS/EIR should contain a discussion of the Laguna wetlands proposals that are part of the project. *(Planning Commissioner) Response: There is no proposal in this project for the Laguna Channel estuary.*

(7) Concerns – Water Quality:

7-A Include in the final report more discussion of the hazardous materials discharging into the creek. *(Planning Commissioner) Response: See the Water Quality Section of the EIS/R for more discussions on water quality.*

7-B Creek widening may accommodate even more shopping carts and other trash. *Response: Preventing the creek from becoming a trash receptacle would require everyone's participation. Trash receptacles located near bridges would help remind folks where trash belongs.*

7-C The alternatives do not provide adequate shading to maintain proper water temperatures, which are important because dissolved oxygen and nutrient balances depend on maintaining temperatures and the proper ranges. *Response: A shading study has been completed and included in the Biology Section of the EIS/R. Extensive shading would be realized within five years and after ten years, coverage of the wider creek would nearly be complete. Currently, at the lowest reach, hardly any shading is available. A temperature study has been completed, which concludes that, even in shaded areas, water temperatures in the lower creek are consistently higher than is typical of streams which steelhead use.*

7-D The vertical walls minimize the potential for vegetation that is necessary to enhance water quality. *Response: See responses to comments 1-B, 2-I and 2-J.*

7-E The preservation of historic buildings should not take priority over water quality. It would be better to relocate the historic structures. *Response: The preservation of historic buildings is part of the City's effort to mitigate or avoid the impacts of this project on the cultural resources of Santa Barbara, as required by City General Plan policies. The City*

has other programs, outside the scope of this project, that would focus on improving the quality of surface runoff that reaches the creek.

7-F Recommendation on how the project should deal with contaminants identified in the

County/City Joint Stormwater Pollution Prevention Plan: install filters on the storm drain outlets. *Response: The Joint City and County Stormwater Pollution Prevention Program would complement this flood control project after completion. These types of water quality measures are beyond the scope and authority of this project.*

7-G The project should take responsibility for and address the state and health of the creek

waters all the way to the ocean. *Response: To the degree that this project may affect the estuary below Cabrillo boulevard, such impacts have been addressed in the EIS/EIR. Additionally, the City has a Creek Water Quality Improvement Project to improve the water quality of the City's creek and beaches. This effort will include many of the Best Management Practices such as public education/outreach, public participation, elicit discharge detection/inspection, construction site runoff inspection/control, and many other water quality improvement measures.*

7-H In the estuary area, sloped vegetated banks along the edges are better than concrete

vertical walls to act as a biofilter. The plants will remove some of the pollutants as the water goes through them. *Response: Although it would be desirable to have sloping vegetated banks for the entire project, the economic requirement of this project would not support such design.*

7-I Increase the native paintings along and on top of the banks to enhance bio-filtration.

Response: The amount of planting on the riprap as currently described has been figured into the hydraulic design of the creek and how it would affect the conveyance capacity of the creek. As much planting on the slopes as allowable has already been included.

(8) Concerns – Aesthetics:

8-A Can aesthetic improvements to the Cabrillo Boulevard Bridge be included in the project?

(Planning Commissioner) Response: The City is already planning for retrofitting and upgrading Cabrillo Boulevard Bridge. It will go through the Historic Landmarks Commission for design review to assure that meets City design standards. The bridge would carry the design capacity, thus, it would not need any modifications.

8-B Include in the final report an inventory of trees so that we can consider whether we want to lose them or save them and lose something else. *(Planning Commissioner) Response: See the Biology Section of the EIS/R for inventory of significant trees.*

8-C Include in the final report a discussion of the bridge walls to be demolished and whether the old stone can be saved, conserved, reused in other parts of the project, or stored at the city for some future use. *(Planning Commissioner) Response: The City plans to reuse salvageable historic masonry for use locally, perhaps in the design of the new bridges or elsewhere in the City.*

8-D Vertical walls and the bridges should be replicated in Italian stone mason fashion.

Response: A local design subcommittee would develop the final surface design and color treatment of vertical walls. As currently proposed, the surface treatment would imitate the sandstone masonry commonly used locally.

8-E One-gallon trees are insufficient. They should be 15-gallon at a minimum. And there should be many more. *Response: It is generally accepted that the resiliency and the mortality of the types of trees proposed to be planted along the banks could be greatly aided by growing them from nursery stock. Smaller trees actually grow faster and establish better root systems than do larger trees. For this reason, younger saplings would be used. However, the City may provide some additional larger trees to establish a more finished appearance in some locations. The number of trees and their spacing is mainly a function of the ability of the wall structure to allow a notch through the heel of the wall footing for the roots to penetrate through, and avoid potential undermining of the wall structure. The spacing could be reduced to perhaps 20' instead of 40'. However, modifications to the wall footing will be required. An increase in construction cost could be expected. This opportunity could be pursued during the final design, if the local sponsors would share the additional construction costs. It should also be noted that, if the larger trees, such as sycamores, are placed too close together, they will not develop broad canopies that proved the most shade. Shallow-rooted willows will be placed between the larger trees to create lush vegetation and shade fairly quickly, until the larger trees grow enough to over shade them.*

8-F The proposed aesthetic treatments should take into the account the views from the bridges as well as the banks. You're going to see the cement from the bridges. You should put in a lot more bank vegetation to hide the cement. The goal should be to make Lower Mission Creek looking like Rocky Nook Park and the Museum of Natural History as much as possible. *Response: See response to comment 8-D.*

8-G We need more specific examples (photos) of aesthetic treatment proposals for the bridges and banks. Sticking a row of trees on the top of a bank won't do much. *Response: Final design of the aesthetic treatment for walls and bridges would be developed and coordinated by the City and a local design subcommittee. Please refer to the Architectural rendering found in the back of the Main Report.*

8-H If you're going to provide trees to homeowners to plant in their backyards, you must guide them as to the right places and planting procedures, or it won't do any good. *Response: The City plans to solicit the support of the appropriate local concerned groups and individuals to administer this program.*

8-I What is the culvert bypass going to look like? *Response: The culvert would be a pair of 15' X 6' concrete boxes with a weir structure at the inlet. It would be open when it crosses underneath Highway 101 and would be covered until it daylights alongside the Chapala Street Bridge.*

8-J Widening the creek means that you won't get shade in the creek bed from the trees for decades. *Response: See* shade discussion in the Biological Resources Section.

8-K Use computer modeling to generate shading patterns from the trees. *(Planning Commissioner) Response: See response to comment 8-J.*

(9) Concerns – Public Safety:

9-A Walkway across the creek could create lighting, security, and liability problems. *Response: This project does not include any walkways across the creek.*

9-B Lighting should be installed in the pocket parks and on the bridges to reduce the possibility of vandalism. *Response: The City, as part of local project embellishments, would include appropriate features to address such concerns.*

(10) Concerns – Socioeconomics:

10-A The proposed walkway along the creek in the vicinity of the Chapala Street Bridge would adversely affect the neighborhood: bright lights shining into homes and a loss of privacy. It would be better to extend the culvert. *Response: This project does not include walkways along the Chapala Street section.*

10-B Property owner objection to move house at 116 Chapala Street just to create a pocket park. City's assessment to determine which structures are cost-efficient to move is somewhat flawed. No one has determined whether this house is movable. *Response: Based on the corrections to the City map used by the Corps in this study, the required clearance for the new creek width across 116 Chapala Street is in fact available. Therefore, removal or relocation of the subject structure would no longer be required.*

10-C Buildings should be moved out of the riparian corridor because they are encroachments.

Response: The cost of numerous additional complete property acquisitions to accommodate more sloping banks would significantly increase the project cost so as to render the project uneconomical in accordance with Federal requirements and would result in non-participation by the Corps.

10-D Vertical walls should not be extended to protect structures. There is too much vertical wall. *Response: See response to comment 10-C.*

10-E Four structures now slated for saving by extending the vertical wall should be reconsidered for removal: on Ortega Street, at the corner of Ortega and Bath, on Cota and Bath, and near De La Vina and Halley. *(Planning Commissioner) Response: See response to 10-C.*

(11) Concerns - Recreation:

11-A What will public access to the creek be? People will have a vested interest in keeping the creek clean if they have greater access. *(Planning Commissioner) Response: Due to safety concerns, access to certain areas of the creek would be controlled. The City and the County would encourage creek access by using the expanded habitat zones.*

11-B Is there an opportunity to use the lower creek around State and Cabrillo as a tourist attraction (maybe a creek walk)? *(Planning Commissioner) Response: Similar improvement for this area is under consideration by the City through another City project.*

11-C Support pocket parks. *Response: Comment Acknowledged.*

(12) Concerns – Maintenance:

12-A How will you take care of trash in the creek? *(Planning Commissioner) Response: The City would primarily be responsible for removing trash from the creek. The County would remove trash or debris that would obstruct creek conveyance.*

12-B Have you given consideration to a street-sweeping program to help keep the creek clean? *(Planning Commissioner) Response: The City is looking into the possibility of extending existing street sweeping efforts to include areas along the creek.*

12-C What will you do if flooding and erosion destroy the vertical walls? *(Planning Commissioner) Response: Any repair needed to maintain or restore the efficacy of the project as designed would be accomplished by the Flood Control District as soon as possible, including repair of vertical walls.*

12-D Who will maintain the box culvert, and how will it be maintained? *(Planning Commissioner) Response: The Flood Control District would have the maintenance responsibility of the creek. Debris or silt would be pushed to either end of the culvert where a loader would transfer the spoil into trucks for disposal. However, based on the proposed design, it is anticipated that very little culvert maintenance will be required.*

12-E Install permanent trash cans at the bridges. *Response: This would be considered by the City to discourage disposal of trash into the creek.*

12-F Trash in the creek needs to be cleaned out more than four times a year. *Response: See response to comment 12-A.*

12-G Maintenance should result in minimal disruption to native paintings on the creek bottom and slopes. *Response: To maintain the flood control capacity of the creek, intermittent removal of creek bed vegetation in a mosaic pattern would be needed.*

12-H clear the streambed in a mosaic pattern to leave some plants at different periods of time to enhance regrowth. Response: *See Response to comment 12-G.*

12-I The high threshold for silt removal should be 25 percent. *Response: County Flood Control uses a 15% threshold for silt removal for maintenance scheduling purposes; however, the flood protection that would be provided by the project is based on a clean*

streambed. There may be a corresponding reduction in conveyance if the siltation is not removed.

12-J Disturbances upstream that would contribute to erosion should be strictly monitored and not allowed. *Response: Any work pertaining to the creek banks would require permitting and would be subject to inspections by City or County Officials.*

12-K The maintenance plan should be developed with community participation. *Response: The maintenance plan developed by the County Flood Control and incorporated into this project was developed with inputs from concerned organizations locally.*

12-L The EIS/EIR should contain more details on the environmental impacts of abatement measures, application of herbicides, and scraping or scouring. *(Planning Commissioner) Response: See the Biology Section of the EIS/R for discussion on impacts of different abatement measures.*

(13) Concerns – Cumulative Impacts:

13-A The La Entrada Project at the intersection of State and Mason Streets. Did the City of Santa Barbara notify the Corps of Engineers of this project? Were Alternative 12's impacts on this project evaluated in the EIS/EIR? *Response: The La Entrada project was approved by Planning Commission in July 1, 1999, and by the City Council on August 17, 1999. To the extent that plans for the Lower Mission Creek project were known, they were considered. This project was reviewed against LCP Policy 12.2. Cumulative review of projects under the policies is not required. It will be necessary for decision makers to evaluate the Lower Mission Creek project against this policy at the time final decisions on the City's participation are made. As a result of concerns raised by Coastal Commission members and staff based on policy concerns, the project applicant has proposed a redesign that would set the new building 25 feet back from the projected creek width in the event that the creek is widened to bring it closer to the proposed new development on the Californian Hotel property. The removal of the building at 15 West Mason Street would result in the existing and any proposed buildings at 35 State Street being outside the 25 foot setback for the flood control project.*

13-B There must be a buffer between the La Entrada Project and the Harbor View Inn Project and the flood control project. *Response: See response to comment 13-A. The Harbor View Inn expansion was approved in March 1999, based on the 60-foot width. As the Municipal Code allows, the Planning Commission granted a waiver to allow some of the new building on the east side and part of the parking lot on the west side to encroach into*

the 25 foot setback. However, unlike the existing situation, there would be a native landscape buffer on the westerly side of the creek. In addition, the landscaping in the parking lot on the east side of the creek would also consist of native species, which is not the case at the present time.

Concerns – Other:

(14)

14-A Planning Commission should look at ways to guide future development so that it doesn't add to water coming down the creek. *Response: Comment acknowledged.*

14-B This project should be just the initial phase of a long-range plan to restore all reaches of Mission Creek (establishing adequate buffer zones, acquiring properties and easements over time, compelling property owners to remove encroachments and impervious surfaces from the creek, and providing incentives for gradual retreat). *Response: Comment acknowledged.*

14-C The City of Santa Barbara Redevelopment Agency (RDA) funds of $2.5 million to augment the restoration components of the flood control project should be spent to buy additional riparian properties for riparian habitat. *Response: The RDA funds are allocated for use to supplement the project and pay for improvements to features already included in the design that would be beyond what the Corps could cost-share. Money from the RDA cannot be used to improve flood control. The Agency funding available would only purchase a very small number of properties due to land and relocation costs. Agency funding can be used more cost-effectively to increase planting, improve project appearance and provide park amenities.*

SECTION - 3 - ALTERNATIVES

3.1 ALTERNATIVES:

In the development of alternatives, extensive coordination occurred between the U.S. Army Corps of Engineers (USACOE), Santa Barbara County, the City of Santa Barbara and concerned business/property owners and environmental groups. Several public workshops and a formal public scoping meeting were conducted to obtain public views regarding the project and development of alternatives. Previously prepared engineering and environmental reports have been reviewed to identify problems and development of the alternatives. The alternatives were evaluated based on past flooding history and the need to provide flood protection to the City of Santa Barbara. In the development of alternatives, protecting properties or reducing the flood threat to the residences and businesses located in the vicinity of Lower Mission Creek and preservation of the environment were considered.

3.2 BACKGROUND INFORMATION:

The process of plan formulation in this study was initiated in 1969. The 1969 improvement plan included: (1) a debris basin just downstream from Foothill Road; (2) a concrete lined channel from the debris basin to Oak Park (just above Highway 101); (3) a covered concrete channel to divert flows under Highway 101, Southern Pacific Railroad and under Modoc Road to Las Positas Road in the adjacent Arroyo Burro drainage area; and (4) a concrete channel along Las Positas Road and Arroyo Burro Creek to the Pacific Ocean. This plan was rejected by the local community on the basis that implementation of this plan would result in significant impacts to environmental resources including biological and aesthetic resources.

In the early 1970's, the USACOE continued their Mission Creek studies in conjunction with the Environmental Quality Advisory Board of the City of Santa Barbara.

In 1978 and 1980, the local sponsor again became interested in pursuing flood protection along Lower Mission Creek. In 1986, the USACOE completed a Feasibility Study, which included structural and no-action alternatives. The alternative recommended in the 1986 feasibility study, referred to as the Lower Mission Creek Project, was authorized by Congress (see details in Main Report, Formulation of Alternative Plans). This project was later determined to be technically infeasible.

In 1993, the City and County of Santa Barbara established the Mission Creek Consensus Group to develop alternatives for flood control on lower Mission Creek. The Consensus Group included two members of the Santa Barbara County Board of Supervisors, two members of the Santa Barbara City Council and representatives of property owners, business owners and environmental groups. Staffing and technical support were provided by the City, the County and the USACOE. The Consensus Group worked together for over a year to develop and analyze possible alternatives that would be acceptable to them and to the community. At the conclusion of the analysis, the Consensus Group made the following recommendation:

> *25-year flood protection (before the floods of 1995, 3210 cfs was thought to constitute a 25-year flood event, after the floods it was determined to be equivalent to an 18-year flood event), with one half horizontal to one vertical (0.5:1) vegetated stabilized sloped banks along the entire project reach with allowance for vertical walls under bridges and at other points of constraint due to buildings or other right-of-way considerations.*

This recommendation was accepted on a 7-1 vote. It was further explained that "vegetated stabilized sloped banks may be constructed with any combination of the following treatments: stepped walls, partial walls, various reinforced earth treatments and gabions." The Consensus Group also indicated that other alternatives should be considered. These included an alternative very similar to the recommended alternative, except that vertical walls would be predominant south of the freeway with allowance for sloped banks where right-of-way allows a more natural treatment. Another alternative for consideration was full 100-year flood protection; however, this alternative was ranked substantially lower than the other alternatives to be considered. It should be noted that prior to the floods of 1995, 3210 cfs was thought to constitute a 25-year flood event.

The USACOE performed a new reconnaissance study in November 1995. This study was based on the Kennedy/Jenks Consultants Report and the recommendations of the Mission Creek Consensus Group discussed above. The Reconnaissance Report looked at several alternatives including non-structural, and no-action alternatives. Non-structural alternatives included (1) flood plain management; (2) flood proofing; and (3) relocation. Structural measures included: (1) conveyance improvements; (2) diversion; and (3) environmental restoration.

Two conveyance improvement alternatives were developed in the Reconnaissance Phase. One alternative would provide 3210 cfs (cubic feet per second) conveyance and the another would provide 5800 cfs conveyance. The 3210 cfs conveyance alternative consisted of a natural

bottom channel with stabilized banks at a 0.5 to 1 slopes and vertical walls. Gabions were proposed for the 0.5 to 1 slope upstream of Highway 101 and vertical walls were proposed downstream of Highway 101. The second conveyance improvement alternative, 5800 cfs, was developed directly from the Kennedy/Jenks Report. The 5800 cfs alternative is essentially the same as the 3210 cfs alternative with the exception of increased base widths to provide the additional capacity. The Environmental Restoration alternative considered three elements: (1) modification of the estuary to permit more frequent salt water penetration during low channel flow periods; (2) re-establishment of a riparian corridor along the creek; and (3) upstream improvements to facilitate salmonid migration (see details in Main Report-chapter IV, Plan Formulation).

Feasibility Phase Plan Formulation:

During Feasibility and Reconnaissance phase studies various alternatives were examined, which included the 5800 cfs and 3210 cfs conveyance capacity and the Environmental Restoration alternatives. A third conveyance alternative was developed during the feasibility phase: the 2500 cfs alternative. This alternative was analyzed to minimize requirements for purchase of real estate. The hydraulic analysis determined that the highest conveyance achievable without replacing the three bridges at State Street, Cabrillo Boulevard and Bath Street was 3400 cfs. Therefore, one of the conveyance alternatives studied in detail in the Feasibility Report was the 3400 cfs alternative. Details about alternatives that were not examined are provided in following paragraphs.

Twelve alternatives, described in the Main Report, Chapter IV, were formulated during the Feasibility Study, including the No Action Alternative. Sections 3.4 and 3.5 of this EIS/EIR provides descriptions of all twelve alternatives.

In this Environmental Impact Statement/ Environmental Impact Report (EIS/EIR), alternatives are divided in three groups: (1) plans eliminated from further engineering and environmental study; (2) technically applicable but economically not feasible alternatives not evaluated for environmental analysis; and (3) alternatives considered in detail for engineering and environmental evaluation. In addition, alternatives for bank stabilization are also discussed in this report. These three groups of alternatives are described in the following paragraphs.

3.3 PLANS ELIMINATED FROM FURTHER STUDY:

To ensure that the best possible plan for the solution of Santa Barbara's flood control problems were identified, both structural and nonstructural methods were studied.

3.3.1 Nonstructural Alternatives:

In the 1986 Feasibility Study, all nonstructural alternatives along Mission Creek suggested by the Mission Creek Alternatives Task Force were considered. These included: (1) a flood plain management plan incorporating flood insurance, restrictions on development in the flood plain and maintenance of a flood warning and evacuation program; (2) a flood proofing plan; and (3) a relocation program.

3.3.1.1 Floodplain Insurance:

Since 1978, the City has participated in the National Flood Insurance Program. This program helps property owners to recover their property or economic loss resulting from flooding. The property owner is required to pay deductible costs for each flood event. They will receive the benefit of the maximum limit of insurance available. However, this insurance program does not cover certain damages including: basements, yard areas, and damage to city and county facilities.

3.3.1.2 Flood Proofing:

There are several non-structural flood proofing measures that can be utilized in order to protect property from floods. These measures range from minimizing the way water comes in contact with damageable items to raising (jacking) the first floor of a structure above a particular flood surface elevation, or building a wall (ring dike) around existing structures to protect them from flood inundation.

3.3.1.3 Relocation:

Relocation of structures in the flood plain was considered. However, Santa Barbara is a highly developed area which has very little space to relocate structures out of the floodplain. In addition, relocation is very expensive, especially in an older community where most properties are already developed.

3.3.2 **Structural Alternatives Eliminated from Further Consideration:**

3.3.2.1 **5800 cfs Conveyance Capacity:**

The channel capacity would be expanded to 5,800 cfs. In order to obtain required capacity, a greater invert width would be required. In addition, the bypass would be expanded to a triple 8 foot by 16 foot box culvert.

Hydraulic modeling of the conveyance alternatives determined that 5800 cfs conveyance was not feasible due to bridge constraints at Bath Street, State Street, and Cabrillo Boulevard Bridges. Replacement of these bridges was considered; however, due to their location, and cost of reconstruction, replacement of the bridges was not economically feasible. In addition, more real estate would need to be purchased in order to construct this alternative. The added costs of replacing these bridges and acquiring additional real estate would likely yield a benefit cost ratio less than 1:1; therefore, this alternative has been eliminated from further consideration.

3.3.3 **Bank Stabilization Alternatives Eliminated From Further Consideration:**

The following alternatives for bank stabilization have been examined but not implemented for the proposed project, primarily due to economic infeasibility.

3.3.3.1 **Natural Bank Protection:**

This alternative consists of leaving the banks and channel bottom natural. This bank protection alternative was not pursued due to the steep slopes that will be required, i.e. 0.5 to 1 side slope and less, in order to achieve project objectives for increased flood capacity without extensive widening of the channel. Widening of the channel would be greater than that proposed under Alternative 12. This would result in project costs exceeding project benefits due to real estate acquisition costs.

3.3.3.2 **Geotextile Bank Protection:**

This alternative consists of using geotextile material as bank protection. The channel bottom would remain natural. This bank protection alternative was not pursued due to the steep slopes that will be required, i.e. 0.5 to 1 side slopes and less, which will not achieve project

objectives. This alternative would be subject to the same stresses as the natural bank protection and would require the same type of analysis. Acquisition costs would be similar.

3.3.3.3 **Grouted Riprap Bank Protection:**

This alternative consists of using grouted riprap without vertical walls as bank protection. The channel bottom would remain natural. This bank protection alternative was not pursued due to the steep slopes that will be required, i.e., 0.5 to 1 side slopes and less. The minimum side slope for stable riprap placement is 1.5 to 1.

3.3.3.4 **Fully-lined Concrete Channel:**

This alternative was not pursued since lining the channel bottom would be environmentally damaging. Implementation of this alternative would have significant impacts on biological, aesthetic and water resources.

3.4 ALTERNATIVES NOT EVALUATED FOR ENVIRONMENTAL ANALYSIS:

Twelve structural Alternatives were evaluated during the Feasibility Study. These alternatives included a No Action Plan, a 2500 cfs capacity with two different channel configurations, and a 3400 cfs capacity with nine different channel configurations. Differences in channel configuration are due to the use of the oxbow-bypass and different combinations of bank protection. Alternatives 2 and 3 would be designed to convey a flow of 2500 cfs, providing about a 15-year level of protection, and Alternatives 4 through 12 would be designed to convey a flow of 3400 cfs, which would provide about a 20-year level of protection.

After the Alternatives Formulation Briefing, based on environmental benefits and the cost benefit ratio, a decision was made that Alternative 12 provides the most incidental environmental benefits and meets the required cost benefit ratio. The twelve alternatives were developed during the feasibility study. However, these alternatives were similar in nature; therefore, based on criteria, similarities and differences in the basic design features, the decision was made to evaluate four Alternatives for detailed environmental analysis in the EIS/EIR. They are Alternatives 1, 6, 8, and 12. Alternative 1 continues to be the No Action plan against which the consequences of structural solutions are evaluated. Details of these Alternatives are described in Section 3.5 of this document. The selected Alternatives have different basic design features and are summarized below in Table 3.4-1.

R In the Draft EIS/EIR, the remaining eight Alternatives were not evaluated further for environmental analysis. Based on the economic analysis performed during the feasibility study phase, four of them, Alternatives 2, 3, 5, and 9, did not meet the benefit to costs (b/c) ratio, these alternatives were not evaluated in the Draft EIS/EIR.

Table - 3.4-1

Comparison of Design Features

Only these Alternatives are evaluated further. Alternative 12 has been identified as the NED (National Economic Development) and tentative preferred plan.

Design Feature	Alt. 6	Alt. 8	Alt. 12 (NED)
Conveyance capacity	3,400 ft^3/sec	3,400 ft^3/sec	3,400 ft^3/sec
Oxbow bypass	no	yes	yes
Some vertical walls	yes	yes	yes
Some stepped walls	yes	no	no
Some riprap slopes with native vegetation above short vertical walls	no	no	yes

R During preparation of the Final EIS/EIR and revised biological assessment, extensive coordination occurred with the concerned resource agencies. The project design and mitigation have been modified due to the resource agencies/public concerns and real estate constraints. Additional mitigation features have been added in the project design to minimize impacts to Federally listed endangered and threatened species. The economic analysis was updated to incorporate costs of the modified project design, mitigation features and real estate. Based on revised economic analysis, Alternatives 2, 3, 5, 6, 7 and 9 do not meet economic requirements.

R At request of the California Coastal Commission (CCC) and in response to public comments, the USACOE performed an informal economic analysis of two smaller versions of the Recommended Plan; both would have a conveyance capacity of 2500 cfs providing approximately 15-year level of protection. The first alternative would use the combination toe

wall and riprap slope (similar to the Recommended Plan) to protect and stabilize the creek banks, and the second alternative would use riprap slope protection to stabilize the entire height of the banks. Both alternatives would apply the proposed bank protection upstream and downstream of Highway 101. Results of this informal analysis can be found in the Economic Appendix of the Main Report. Available information from the earlier 2500 cfs Alternatives found in the feasibility report, including construction costs, right-of-way costs and damage reduction benefits were used in this analysis. The results indicate that these two alternatives would not be economically feasible and therefore would not warrant Federal participation. Like the other previously analyzed alternatives that are not economically viable, these alternatives would not have been carried forward for detailed analysis in plan formulation and the EIS/EIR.

R Alternative 6 was evaluated in the Draft EIS/EIR, and it was economically feasible as per economic analysis performed during the Feasibility study. However, the updated economic analysis revealed that this alternative is no longer economically feasible. However, the environmental analysis of the Alternative 6 has been included in the Final EIS/EIR, because Alternative 6 contains features that are not included in the other evaluated Alternatives in the Final EIS/EIR.

The various design features of Alternatives 4, 6, and 7 have corresponding equivalents in Alternatives 8, 10, and 11. Alternative 12 also corresponds to design features of Alternatives 10 and 11. Based on those equivalencies, further environmental evaluation has not been performed for Alternatives 4, 7, 10, and 11. Plans of all alternatives except Alternative 1 are provided in the Main Report. The Alternatives not evaluated further for the environmental analysis are briefly described in the following paragraphs. ***The numbering of Alternatives is kept the same as the Main Report for consistency and comparison purposes. The Main Report describes all 12 Alternatives formulated during the feasibility study. Alternatives are presented in the EIS/EIR are not in a sequential order. Description and evaluation of the preferred Alternative 12 is provided first followed by other alternatives evaluated for the environmental resources.***

R 3.4.2 **Description of Alternatives Technically Feasible but Economically and Infeasible and Not Evaluated for Environmental Analysis**:

During feasibility study following alternatives were examined in details for their technical and economical feasibility. The alternatives provided in the following paragraphs are technically feasible but economically not feasible, therefore detailed environmental evaluation has not been performed.

3.4.2.1 **Alternative No. 2: 2500 cfs Capacity - Stabilized sides using combination vegetated stepped walls and vertical walls.**

This alternative would increase the channel capacity to 2,500 cfs and would provide approximately a 15-year level of protection. The natural bottom would be maintained and would consist of stabilized banks at a 2:1 (V:H) slope above Highway 101. Below Highway 101, vertical walls would be the dominant bank treatment with sloped bank treatment applied whenever practicable. The channel width would range from 36 to 56 feet at the top of the bank, except between the State Street and Cabrillo Boulevard Bridges, where the top width would be from 60-70 feet. The average depth of the creek would be about 8 to 12 feet. The improved creek would generally follow the existing alignment. Six bridges along the study reach would be replaced, including the Ortega Street, Cota Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges. This alternative has not been evaluated for the detailed analysis because it is not economically feasible.

3.4.2.2 **Alternative No. 3: 2500 cfs Capacity - Stabilized sides using vertical walls.**

This alternative is similar to Alternative 2, except that the sides would be stabilized using vertical walls only. The channel width would range from 30 to 50 feet at the top, except between the State Street and Cabrillo Boulevard Bridges, where the top width would be 60 to 70 feet. The average depth of the channel would be approximately 8 to 12 feet. Also, the same bridges would need to be replaced. This alternative is also not economically feasible.

3.4.2.3 **Alternative No. 4: 3400 cfs Capacity Without Oxbow Bypass - Stabilized sides using vertical walls.**

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of concrete vertical walls throughout the project reach. The improved creek would generally follow the existing creek alignment. The channel would be from 44 to 60 feet wide at the top of the bank, except between the State Street and Cabrillo Boulevard Bridges, where the top width would be 60 to 70 feet wide. The average depth of the channel would be 8 to 12 feet. Seven bridges along the study reach would be replaced, including the Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Lower Mission Creek develops a meandering course near the downtown section of Santa Barbara. Due to the meandering course of the creek, an oxbow has developed between Yanonali and Gutierrez Streets. This alternative would involve stabilization of the creek banks and modification of the creek course along the oxbow, including demolition of the existing sandstone channel. Construction along and/or within the oxbow area is called the "*Without Oxbow Bypass*".

R The location of the oxbow is shown on Figure 3.5-2. This alternative has similar design features as alternative 8, and the environmental impacts would be the same as Alternative 8.

3.4.2.4 **Alternative No. 5: 3400 cfs Capacity Without Oxbow Bypass - Stabilized sides using vegetated stepped walls.**

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. A natural bottom would be maintained and would consist of vegetated stepped banks at a 2:1 (V:H) slope throughout the study reach, except at the south end of the oxbow along the railroad tracks. The improved creek would generally follow the existing alignment throughout the project reach. The creek would be 50 to 70 feet wide at the top of the bank and 8 to 12 feet deep. Seven bridges along the study reach would be replaced, including the Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges. Alternative 5 is not economically feasible.

3.4.2.5 **Alternative No. 7: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using combination vegetated stepped walls and vertical walls.**

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. A natural bottom would be maintained and would consist of stabilized banks at a 2:1 (V:H) slope above Highway 101. Below Highway 101, vertical walls would be the dominant bank treatment. The improved creek would generally follow the existing alignment throughout the project reach. The creek would be 50 to 70 feet wide at the top of the bank and 8 to 12 feet deep. Seven bridges along the study reach would be replaced, including the Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges. This Alternative does not meet federal economic requirements.

3.4.2.6 **Alternative No. 9: 3400 cfs Capacity with Oxbow Bypass - Stabilized sides using vegetated stepped walls.**

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. A natural bottom would be maintained and would consist of vegetated stepped banks at a 2:1 (V:H) slope throughout the study reach, except at the oxbow and the new culvert. This alternative would incorporate a new culvert, by-passing the oxbow just above Highway 101 to the Chapala Street Bridge. The improved creek would generally follow the existing alignment except at the oxbow which would be left in place to function as a low flow channel. The oxbow bypass would carry high flows. The creek would be 50 to 70 feet wide at the top of the bank. The average depth of the creek would be about 8 to 12 feet. Five bridges along the study reach would be replaced, including the Ortega Street, Cota Street, De la Vina Street, Chapala Street, and Mason Street Bridges. Alternative 9 can not be implemented because it does not meet federal economic requirements.

3.4.2.7 **Alternative No. 10: 3400 cfs Capacity With Oxbow Bypass - Stabilized sides using predominantly vegetated stepped walls with vertical walls applied for the remaining reaches.**

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. A natural bottom would be maintained and the sides would consist of vegetated stepped banks at a 2:1 (V:H) slope upstream of Highway 101. Below Highway 101, vegetated stepped walls would be applied along the southeast bank, starting from midway between Chapala and Mason Street Bridges to State Street, and along the middle third of the southwest bank between Mason Street and State Street. Vertical walls would be maintained for the remainder of this reach. This alternative would incorporate a new culvert, by-passing the oxbow just above Highway 101 to the Chapala Street Bridge. The improved creek would generally follow the existing alignment except at the oxbow which would be left in place to function as a low flow channel. The oxbow bypass would carry high flows. The creek width would range from 50 to 70 feet at the top of the bank. The average depth of the creek would range from 8 to 12 feet. Five bridges along the study reach would be replaced including the Ortega Street, Cota Street, De la Vina Street, Chapala Street, and Mason Street Bridges. Alternative 10 is not evaluated for the environmental analysis because it does not meet the required benefit to cost ratio.

3.4.2.8 **Alternative No. 11: 3400 cfs Capacity with Oxbow Bypass - Stabilized sides using combination vegetated stepped walls and vertical walls.**

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. A natural bottom would be maintained and would consist of stabilized banks at a 2:1 (V:H) slope above Highway 101. Below Highway 101, vertical walls would be the dominant bank treatment with sloped bank treatment applied whenever practicable. This alternative would incorporate a new culvert to carry high flows, by-passing the oxbow just above Highway 101 to the Chapala Street Bridge. The improved creek would generally follow the existing alignment except at the oxbow which would be left in place to function as a low flow channel. The creek would be 50 to 70 feet wide at the top of the bank. The average depth of the creek would be about 8 to 12 feet. Five bridges along the study reach would be replaced including the Ortega Street, Cota Street, De la Vina Street, Chapala Street, and Mason Street Bridges. Economic analysis revealed that this Alternative is not economically feasible.

3.5 ALTERNATIVES CONSIDERED IN DETAIL AND EVALUATED FOR ENVIRONMENTAL ANALYSIS:

Section 3.4 describes the alternatives not evaluated for environmental analysis. After the AFB briefing, the decision was made to evaluate four alternatives providing 3400 cfs capacity. These alternatives differ in channel configuration due to the use of the oxbow-bypass and/or different combinations of bank protection. Bank protection consists of vertical concrete walls, a combination of vertical and stepped walls, and a combination of vertical walls and riprap. Figure 3.5.1 provides the location of the project area. Figure 3.5.2 provides the location of the oxbow and bypass culvert. The EIS/EIR evaluates environmental resources located within the project area. Mitigation measures have been developed to minimize project related impacts for each resource. The study is limited to the final 1.2 miles of the creek, between Canon Perdido Street and Cabrillo Boulevard. This study does not extend to the lagoon. Plans of all evaluated Alternatives are included in the Main Report.

Alternative No. 12 is the National Economic Development (NED) and tentatively Recommended Alternative. This alternative is also the environmentally superior plan compared to all other alternatives identified in the following paragraphs. Initially, this alternative may result in damaging slightly more biological resources, but in the future it will provide maximum biological values and quality and quantity of habitat compared to other feasible alternatives. This alternative provides incidental environmental benefits by planting native and riparian type

habitat along the riprap banks and in habitat expansion zones (see Figure 3.5.3 locations of habitat expansion zones along Lower Mission Creek). Alternative 12 provides an opportunity for construction of a wetland and habitat expansion zones. The habitat expansion zones would provide a dual benefit by expanding riparian habitat along the creek and creating passive park areas for use by area residents.

Numbering of Alternatives is kept the same as the Main Report for consistency and comparison purposes. Alternatives are also not in a sequential order because at the AFB conference the decision was made that Alternative No. 12 is the NED and a tentatively Recommended Alternative. Therefore, a detailed project description is developed for Alternative 12 and placed prior to the other evaluated alternatives.

3.5.1 Alternative No - 1: No Action.

With this alternative (future without project conditions), the existing channel and sideslope protection would remain in place. In the past, the creek banks were damaged during major flood events. During that time, the local sponsor and private property owners have constructed various types of slope protection at various locations, including: concrete or timber walls, sand bags, and grouted stone. During any major flood event, the creek banks may require maintenance and replacement. As well, periodic sediment removal by Santa Barbara County would continue to be required to maintain channel capacity. This existing channel ranges from 30 to 50 feet wide, except channel top width is wider between the State Street and Cabrillo Boulevard Bridges. The average depth of the creek is about 8 to 12 feet. The capacity of the channel is about 1050 cfs, about a 5-year level of flood protection.

3.5.2 Alternative No. 12: 3400 cfs Capacity, With Oxbow Bypass, Stabilized Sides Using Predominantly A Combination of Riprap Slopes Above Short Vertical Walls (NED/Tentatively Recommended Alternative-The Project Description).

Alternative 12 is the National Economic Development (NED) Alternative, as well as the tentatively Recommended Alternative. This Alternative would provide maximum incidental environmental benefits, and it is an environmentally superior plan compared to other viable alternatives considered during the feasibility study.

Alternative No. 12 consists of: improvements of the channel for approximately the last mile of the creek between the Canon Perdido Street Bridge at the upstream end and the Cabrillo Boulevard Bridge near the outlet; replacement of four bridges, streamlining bedslope, installing a

culvert that bypasses the oxbow, stabilizing creek banks using vertical walls and riprap sideslope; and planting of native vegetation along the riprap (Figure 3.5.4 of the EIS/EIR, detailed plan provided in the main report). The creek width would range from 60 to 70 feet wide at the top. The specific width of the channel at each bridge crossing is listed in Chapter 4, Plan Formulation, of the Main Report. The average depth of the creek would be 8 to 12 feet throughout the project reach. Future maintenance for the life of the project is included in this project description. Future maintenance of the constructed channel is essential to retain the form and design capacity of the creek. Impacts related to future maintenance are addressed in this document. A more detailed description of future maintenance is included in Section 3.5.3. Chapters 6 through 19 describe existing conditions and address impacts related to this proposed project. Environmental commitments and mitigation measures are included to avoid/reduce or minimize impacts to natural and cultural resources.

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of flood protection. The natural bottom would be maintained and creek banks would consist of a combination vertical wall and ungrouted riprap. The bottom half of the bank would consist of a vertical wall while the upper half would be built with riprap at a 1.5:1 (H:V) slope. Aesthetic treatment would be incorporated into the project design to minimize the visual impacts of vertical walls. The riprap would be covered with topsoil. Concrete pipes of varying sizes (up to a maximum of three feet in diameter) would be strategically placed in between the riprap to allow planting of native trees and vegetation. Native willows or branches and other native herbaceous plants would be planted beneath the riprap and would sprout through gaps in it to form continuous understory riparian growth.

Upstream of Highway 101, the combination of vertical wall and riprap would be the predominant bank treatment, except in two short reaches just upstream of the Haley-De la Vina and De la Guerra Bridges. Below Highway 101, the combination of vertical wall and riprap would be applied along the southeast bank, starting from midway between the Chapala and Mason Street Bridges to the State Street Bridge. Vertical walls would be maintained for the remainder of this reach.

The improved creek would generally follow the existing alignment and would incorporate a new culvert between Highway 101 and the Chapala Street Bridge that would carry high flows and bypass the oxbow. The oxbow would be left in place to function as the low flow channel.

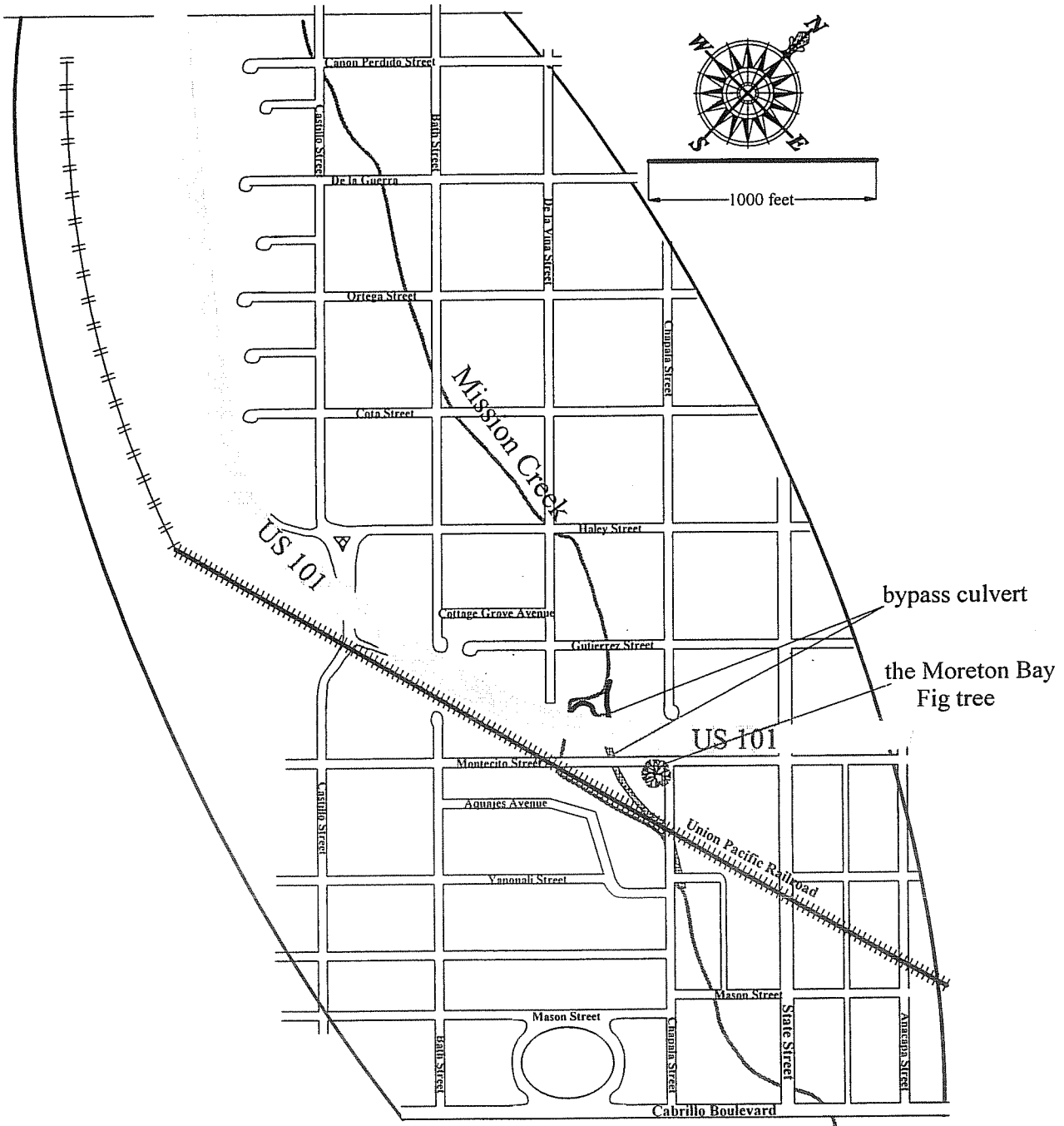


Figure 3.5.1-1: Lower Mission Creek and general features associated with the proposed project.

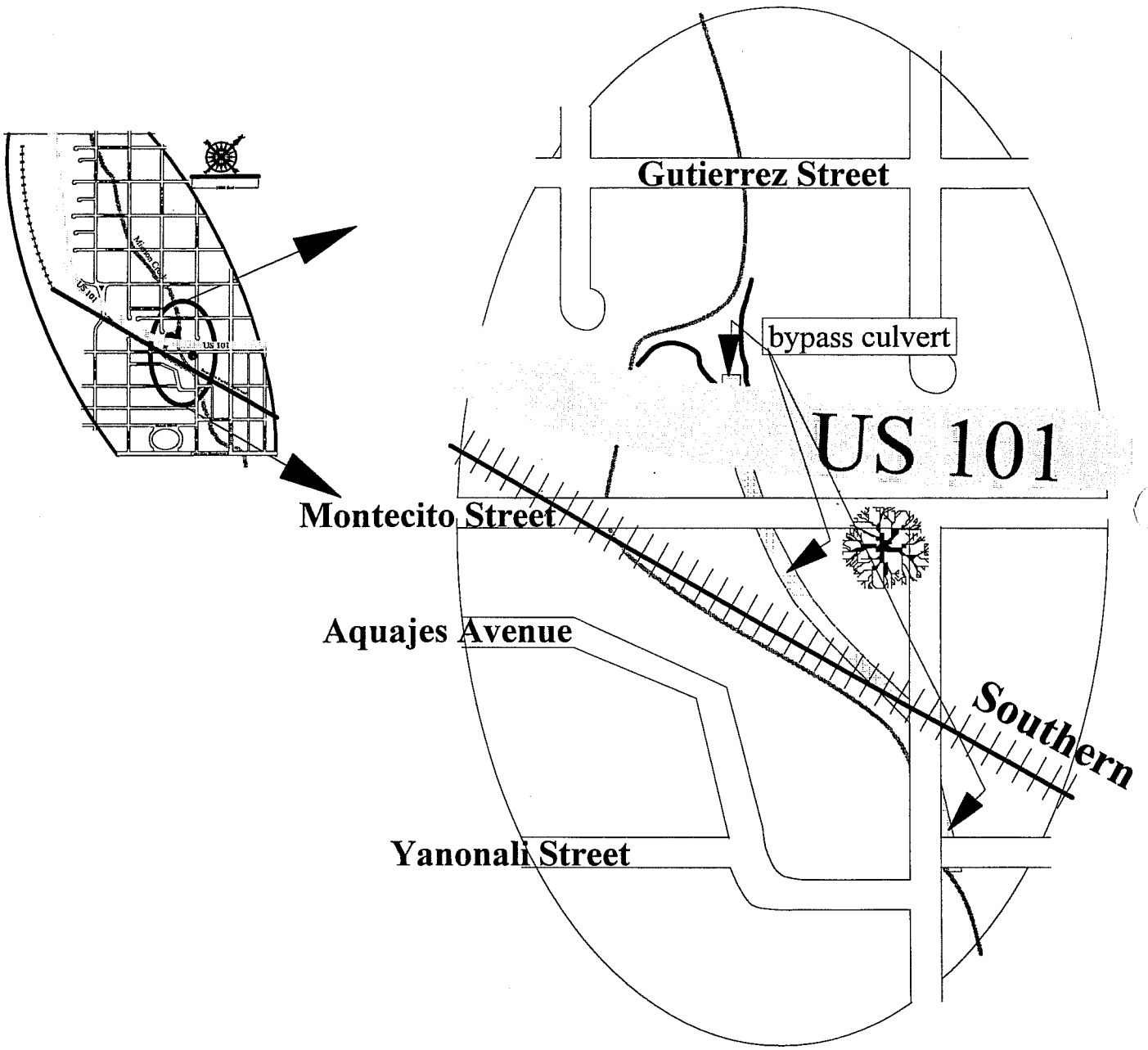


Figure 3.5.2-2: Location of the oxbow bypass culvert

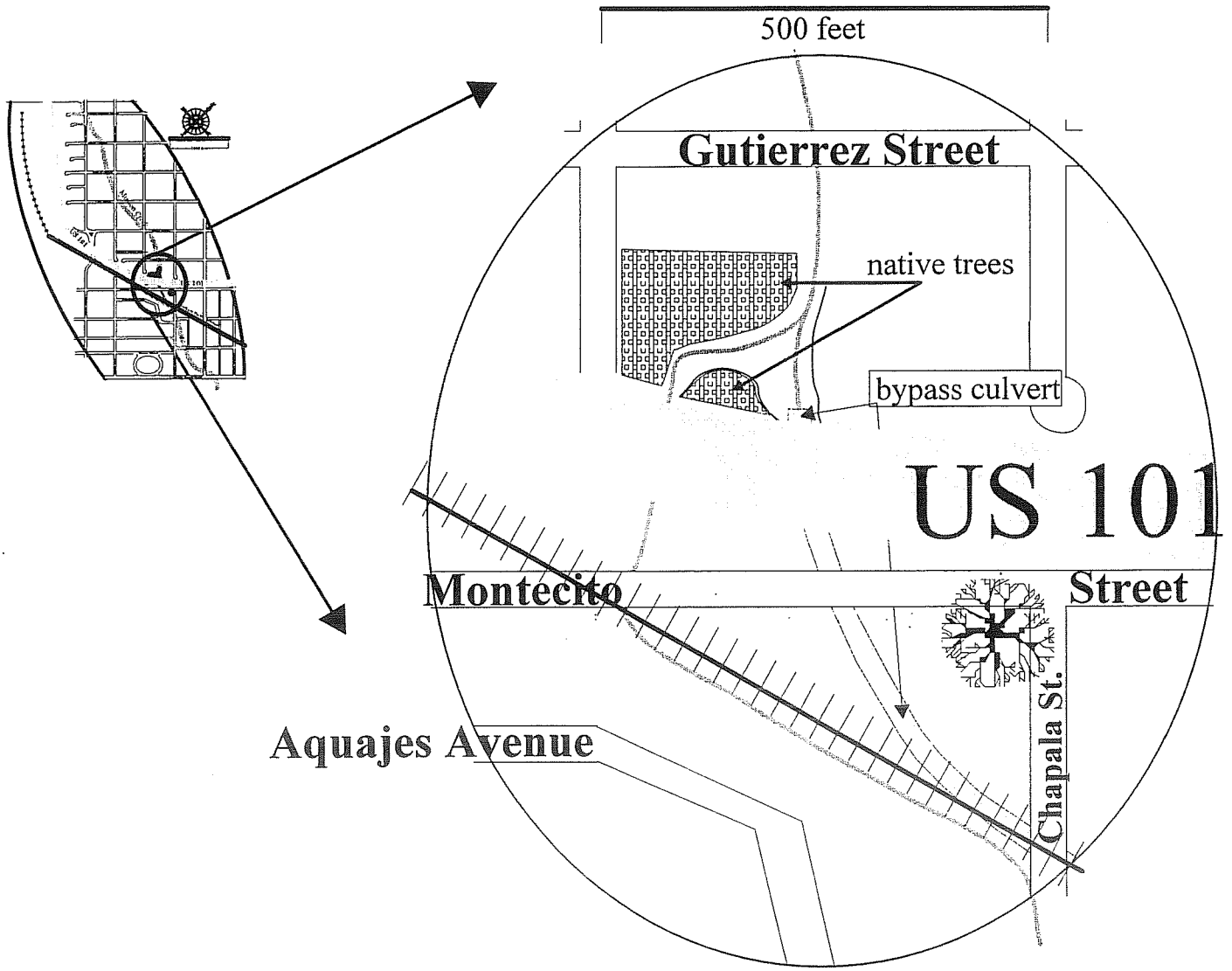


Figure 3.5.2-3: Location of possible future habitat expansion zone in the upper part of the oxbow.

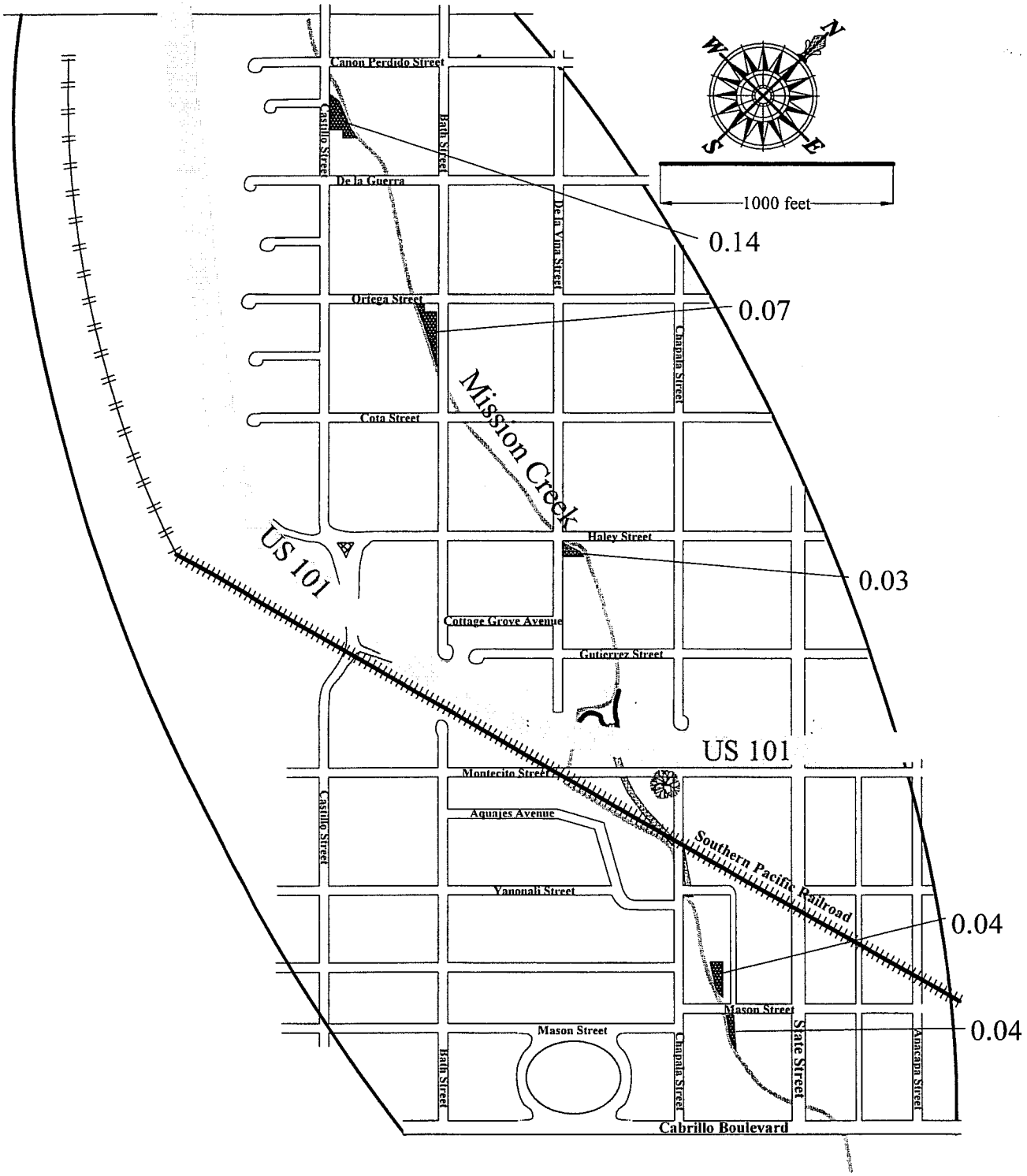


Figure 3.5.2-4. Locations of habitat expansion zones. Shapes of each and size in acres are approximate.

R Five small parcels of open land would be available along the banks after completion of project construction. These parcels range in size between 0.03 and 0.14 acres (Fig. 3.5.4). Final calculations for the Chanel's configuration will determine the size and location of all five of these parcels. These open land parcels would be designed to serve a dual purpose: to expand the corridor of riparian habitat to be planted along the stream banks, and to provide passive park space for area residents. Native trees, primarily western sycamores, cottonwoods, and coast live oak, from local stock would be planted in the habitat expansion zones. In time, their canopies would form dense clusters on the overbank and adjacent to the stream corridor (Fig. 3.5.5). In some of these zones, pathways and benches might also be added to create passive park spaces.

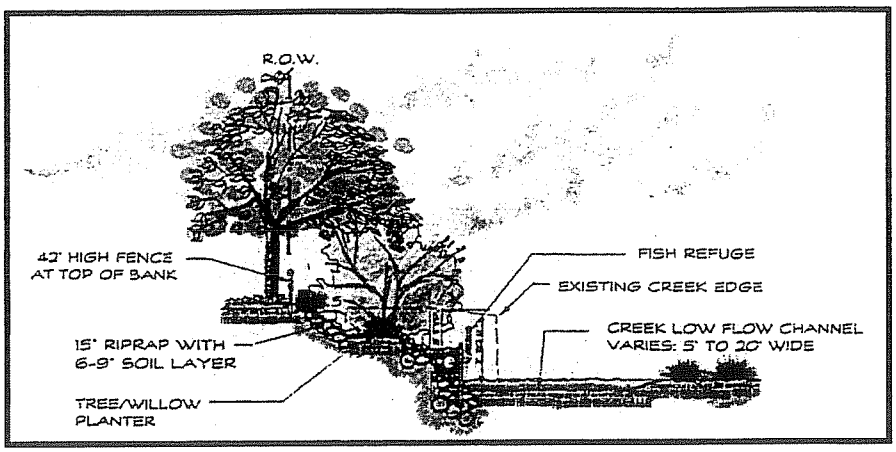


Figure 3.5.2-5 Representative Cross Section of a Habitat Expansion Area

Planting along the riprap and planting of native trees in habitat expansion zones are an integral part of the project design. The ecological values generated by these features would offset impacts from the implementation of the proposed alternative on existing streambank vegetation. Therefore, no additional mitigation for effects to bank habitat would be required. This proposed alternative would provide maximum habitat values compared to all other alternatives evaluated in this document. In the long-term, the habitat value within the project reach would exceed the value of the existing habitat.

If any of the planting on the aforementioned features is deleted from the project design, then impacts related to the biological resources would need to be recalculated, which could result in additional mitigation.

R This alternative would also provide the opportunity to construct another habitat expansion zone in the vicinity of the oxbow formation area. This habitat expansion zone would be located just upstream of Highway 101. It would be located in the vicinity of De la Vina Street on the west and Gutierrez Street on the north. The total area to be created would be about 0.6 acres (25,800 square feet, see Figure 3.5.3 for location). This area was originally proposed as a constructed wetland. However, after further review, it was determined that this site is more suitable for use as a habitat expansion zone, as decried above. The construction of this feature would provide additional ecological benefits. However, its construction would be subject to cleanup of the existing known contamination on the site (see details in Section 15, HTRW of the EIS/EIR). If, prior to the completion of project construction, the designated site is remediated, then the habitat expansion zone would be constructed as planned.

Four bridges along the study reach would be replaced including the Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges.

3.5.2.1 **Detailed Project Description of Each Feature Associated with the Tentative Recommended Plan:**

R The project description and future maintenance have been revised based on hydraulic/engineering, and real estate constraints and comments received from the resource agencies, and to include structural features to mitigate or minimize impacts to the biological resources, particularly to the Federally listed species, steelhead and gobies. Future maintenance of the constructed channel and culvert and weir length and height has been modified based on additional Hydraulic Analysis performed for the Recommended Plan.

Removal of Existing Bank Protection and Earthen Material:

The creek bottom and banks for about a mile, between the Canon Perdido Street and Cabrillo Boulevard Bridges, would be excavated to increase the creek capacity to provide a 20-year level of flood protection to the City of Santa Barbara. The removal of all existing banks would occur within the project reach except for a retaining wall located just upstream of De la Guerra Bridge, and both banks along the oxbow between Highway 101 and the Chapala Street Bridge. The excavation of the channel would begin from the downstream end of the project near Cabrillo Boulevard and progress upstream.

R The total amount of material to be excavated from creek banks and creek bottom would be about 82,000 cubic yards (cy). Creek excavation would occur section by section. Therefore, all 82,000 cy of material would not be stockpiled at one time. About 17,000 to 18,000 cy of material would be utilized in project construction as fill material. The remaining 64,000 cy of

excavated material can be stockpiled or be taken to a county yard for storage or recycling depending on whether it meets project specifications. Expected debris would include stacked burlap bags filled with concrete, large rocks, mortared riprap, slabs of concrete, grouted stone, jointed masonry walls, shot-crete walls, wire baskets filled with coarse rock (gabions), formed walls, wooden pilings, and other bank material found throughout the length of the project. The material could be distributed to other construction sites requiring fill. All of the sandstone not used in project construction will either be conserved for use in other City projects or, if badly damaged, recycled. Most of the metal and concrete can be recycled. The green waste can be composed and recycled as compost and mulch. The USACOE will examine suitability of the excavated material for beach nourishment. If material is suitable, it can be used to restore sand supply on local beaches.

It is assumed that very small amounts of excess material would be transported within a radius of about 10 to 25 miles from the project site. At maximum, about 30,000 to 40,000 cy of material would need to be transported to the disposal sites either at the Tajiguas Landfill, located 25 miles west of the project site or used in a reclamation site (if one exists at the time of construction). About 1,500 to 2,000 truck trips would be required to transport the excavated material. Channel excavation may last for about 130 to 180 days; however, excavation and construction activities, including bank stabilization and construction of bridges etc., would be accomplished at the same time. The construction would be performed in segments. Therefore, the estimated time frame for project construction is about two years. In case of inclement weather conditions, mechanical failure, funding constraints, or environmental reasons, project construction may be prolonged for three to four years. It is expected that about 150 to 600 cy of material would be removed each day. Therefore, it is assumed that about 5 to 15 truck trips would be required per day to transport excavated material to the staging or stockpile area.

Stabilization of Creek Banks:

The existing creek banks would either be replaced with the combination short walls and riprap sideslopes or vertical walls. The vertical walls would be constructed in two methods, according to their proximity to any existing structures. The first method would be the use of an inverted "T" footing. This less expensive construction method would be applied in areas where sufficient rights–of-way are available without directly impacting existing structures. In areas with limited rights-of-way and close proximity to structures, a pier footing construction design would be applied. Typical cross sections of these designs are shown in the Plates found at the end of the Main Report, and Figure 3.5.2.1-1, 3.5.2.1-2 of the EIS/EIR.

Where the riprap-vertical wall is used, the height of the wall would be approximately half the depth of the creek. The riprap sideslope would be built at a 1.5:1.0 (H:V) slope. Concrete pipes of varying sizes, placed vertically in between the riprap, would serve as openings for planting of native riparian vegetation. The riprap sideslope would be covered with topsoil and

planted with ground cover and shrubs that would help develop the understory of the larger riparian canopy along the creek.

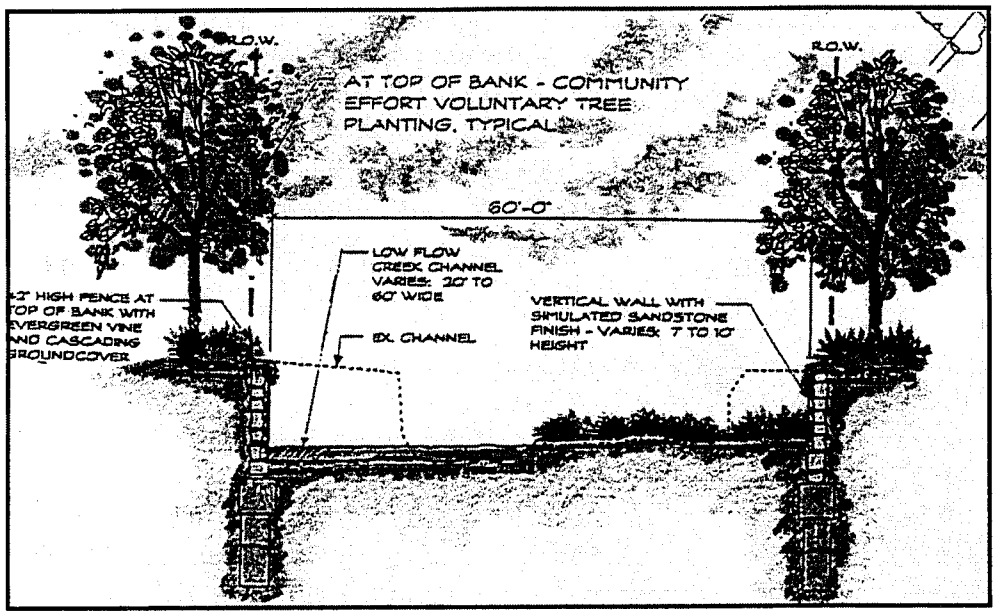


Figure 3.5.2.1-1 - Vertical Wall on Pier Footing Representative Cross Section

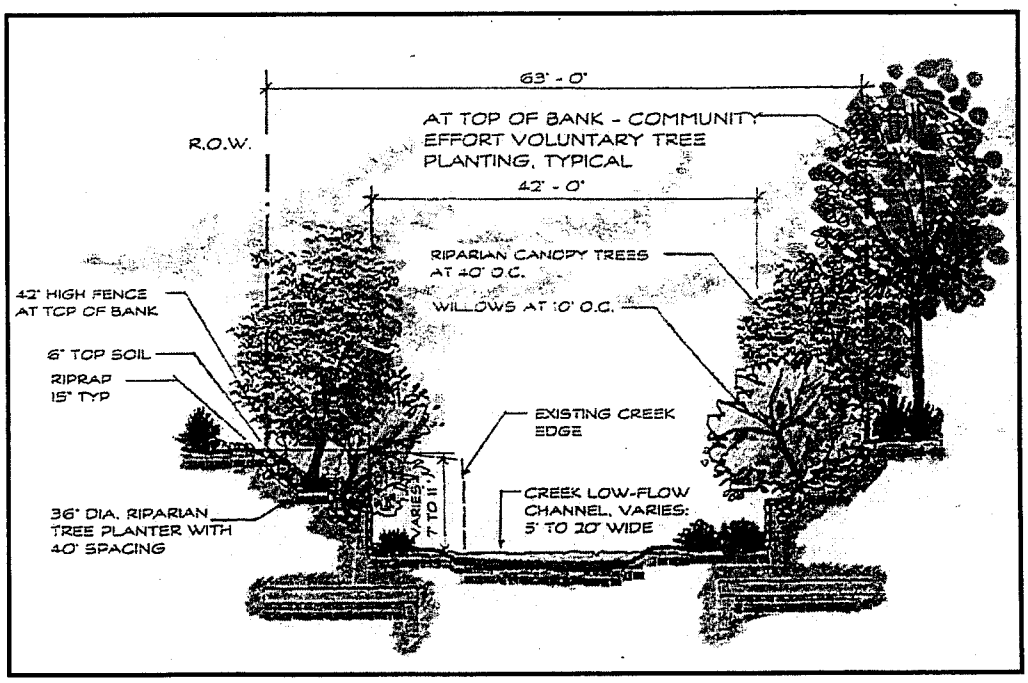


Figure 3.5.2.1-2 - Vegetated Riprap Sideslope on Inverted "T" Footing Representative Cross Section

Removal and Replacement of Bridges:

Lower Mission Creek is spanned by twelve bridges before emptying into the Pacific Ocean. Four of those bridges would need to be replaced including Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges. The De la Vina Street Bridge will be replaced by the city prior to implementation of this project. It is expected that the sequence of the remaining bridge demolition and reconstruction would complement the creek improvement construction schedule. Construction of the bridge replacements at the road crossings would need to be phased so that an adjacent road crossing could be used as a detour. Bridge reconstruction would start with the most downstream bridge (Mason State Bridge) and progress sequentially in the upstream direction ahead of the creek improvements. This would enable flood control benefits to be realized for the area downstream of the improved creek during the construction phase.

R **Weir Inlet and Culvert that Bypasses the Oxbow :**

The reach referred to, as the "oxbow" is where the sharpest bends of the creek within the project area are found. The oxbow runs the length of the creek between the Gutierrez and the Chapala Street Bridges, where the creek makes several sharp turns, while crossing Highway 101, the Montecito Street Bridge, and Union Pacific Railroad before joining its most direct path to the Pacific Ocean (See Figure 3.5.2.1-3). The culvert (two 15-foot wide by 6-foot high boxes) connecting both ends of the oxbow is referred to as the overflow culvert or the "oxbow bypass". The overflow culvert would follow a more direct path across the oxbow. It would begin upstream of Highway 101, pass under the highway (where CalTrans had built a span to accommodate such a crossing to eliminate impacts to highway traffic), Montecito Street, and the railroad tracks before rejoining the creek alongside the downstream end of Chapala Street Bridge (See Figure 3.5.2.1-3).

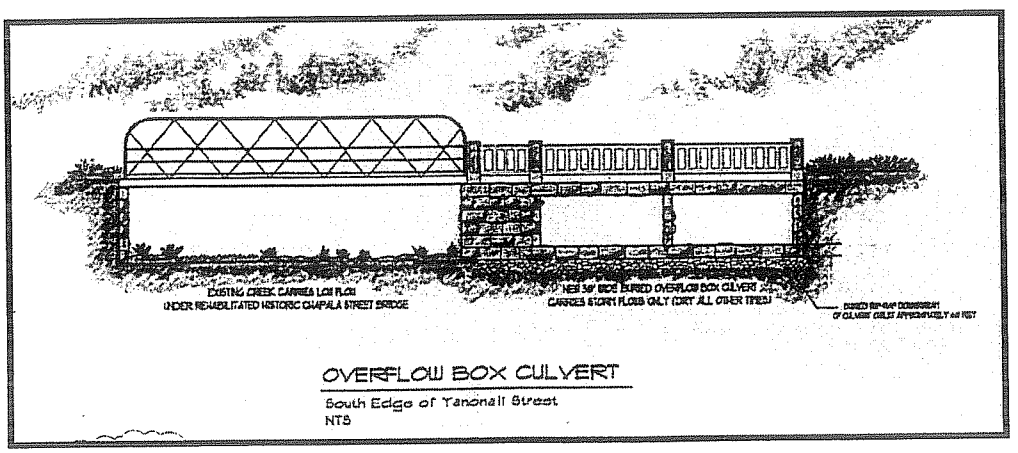


Figure 3.5.2.1-3 - Outlet of Overflow Culvert Alongside Chapala Street Bridge

The culvert alignment would be far outside the Moreton Bay Fig tree dripline to minimize impacts to its major root system. The culvert would not be covered across Highway 101. However, it would be covered across Montecito Street to its confluence at the downstream end of the Chapala Street Bridge.

A weir structure (see Figure 3.5.2.1-4) would be built at the inlet of the culvert to control the flows through the culvert and the oxbow. The height of the weir would be set in order to direct lower flows of up to 640 cfs through the oxbow. Also, the weir would split higher flows (up to the design conveyance capacity of 3400cfs) between the culvert and the oxbow.

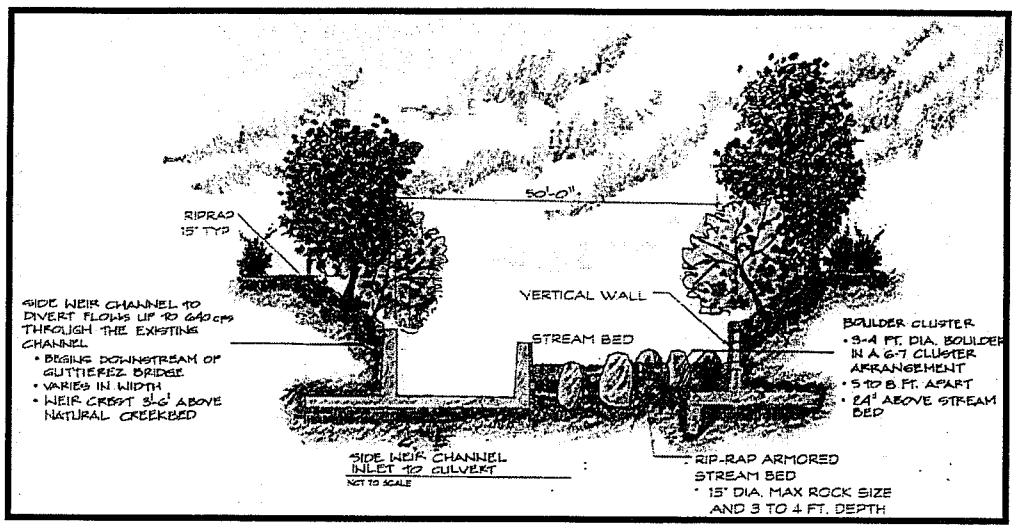


Figure 3.5.2.1-4 - Representative Cross Section of Side Weir Channel Inlet to Overflow Culvert (Looking Downstream).

The culvert divider would be designed to form a "bullnose" and help minimize the potential of debris blockage. Refer to Exhibits in the Main Report for the details of these design elements.

Reach by Reach Project Description:

The detailed improvements described in the following sections are segmented between successive bridge crossings. For orientation, the left and right banks are described while facing downstream (right would be towards the west and left towards the east). The creek generally flows southeasterly as it heads towards the Pacific Ocean. Reference station markings to Exhibit 3, Sheets 1 to 4 of the Main Report.

Canon Perdido Street Bridge to De la Guerra Street Bridge (Station 61+36 to 57+00):

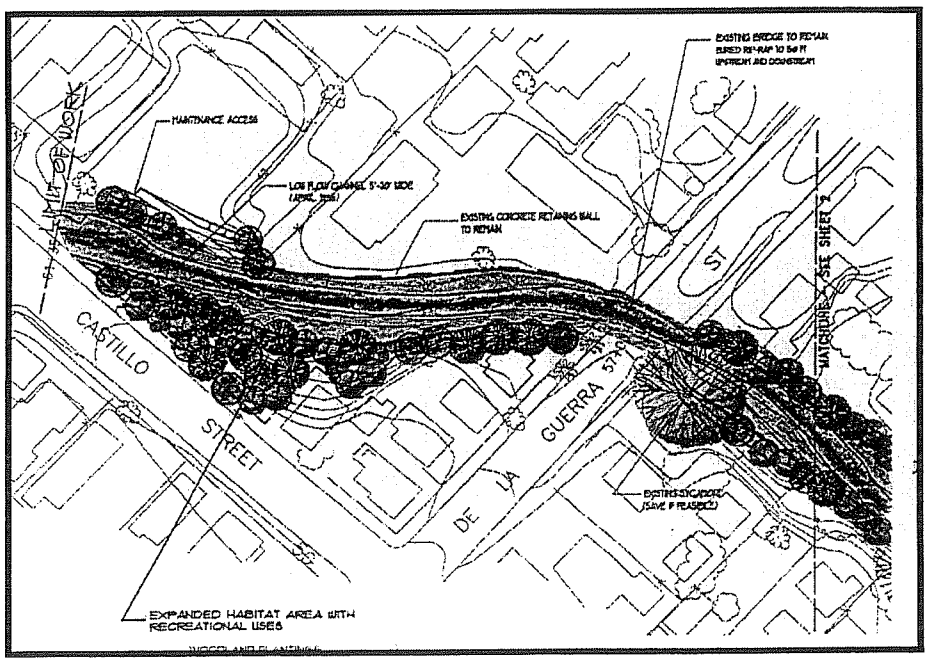


Figure 3.5.2.1-5 - Canon Perdido and De La Guerra Street Bridges (Upstream End of the Project)

Canon Perdido Street Bridge marks the upstream boundary of the project. Immediately upstream of this bridge is an existing channelized portion of the creek, which conveys flows at high velocities into the project area. Between Canon Perdido Street and De la Guerra Street, the creek would be 63 feet wide at the top of bank with an average depth of 7.5 feet. The right bank would mostly consist of the toe wall and riprap sideslope, except for the section just upstream of De la Guerra Street Bridge, where vertical wall would be used. The left bank would maintain the existing retaining wall along the last two-thirds of its length; the upstream remainder of the left bank would consist of vertical wall-riprap sideslope. A maintenance access ramp would be incorporated on the left bank. A habitat expansion area would be created on the creek terrace along Castillo Street. The creek bed along this reach would be armored with riprap and boulder clusters to act as energy dissipaters.

De la Guerra Street Bridge to Ortega Street Bridge (Station 57+00 to 52+30):

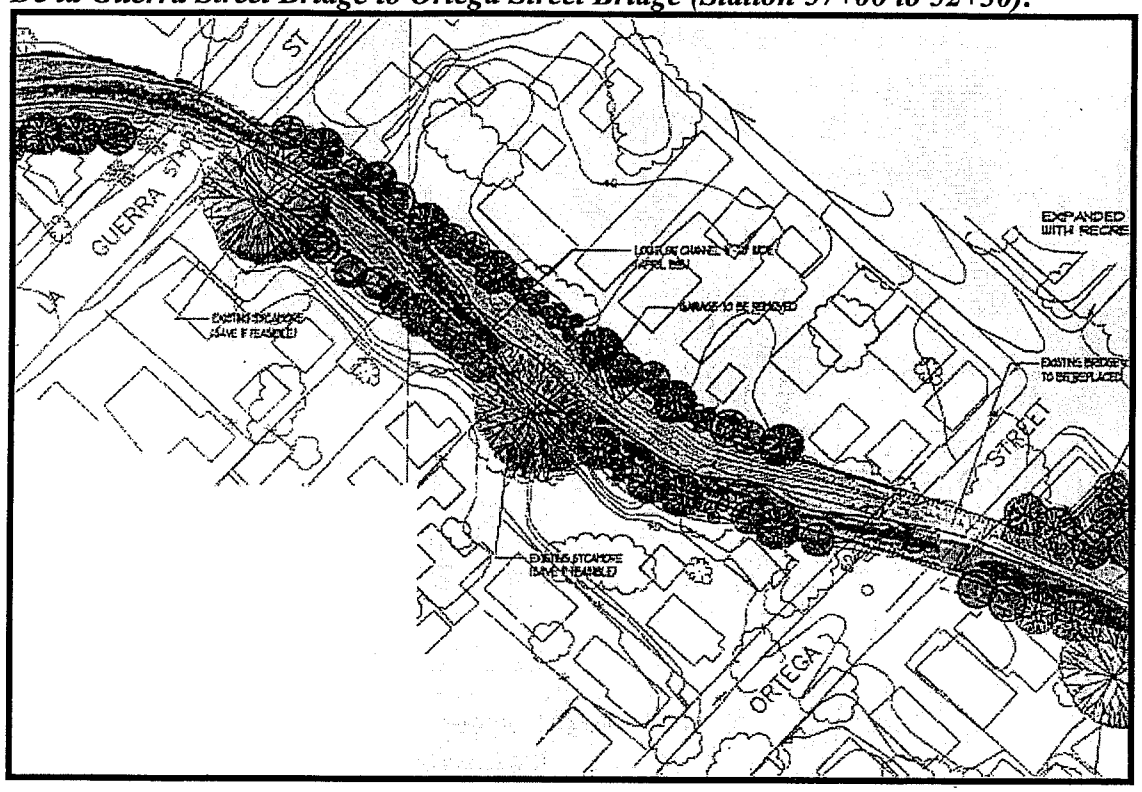


Figure 3.5.2.1-6 - De La Guerra Street Bridge to Ortega Street Bridge

The creek would be 63 feet wide at the top of bank along this reach with both banks consisting of toe wall and riprap sideslope, except for a short reach on the left side immediately upstream of the Ortega Street Bridge where full height vertical walls would be used to avoid impacting a culturally significant structure. This reach would have an average depth of 9 feet. The invert slope would be streamlined, necessitating excavation and removal of one to four feet of streambed. Approximately 150 feet of streambed immediately upstream and another 150 feet immediately downstream of the De la Guerra Street Bridge would be a parking structure located along the left bank at station 54+00 would be removed to accommodate the required wider channel. The Ortega Street Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow.

Ortega Street Bridge to Bath Street Bridge (Station 52+30 to 49+00):

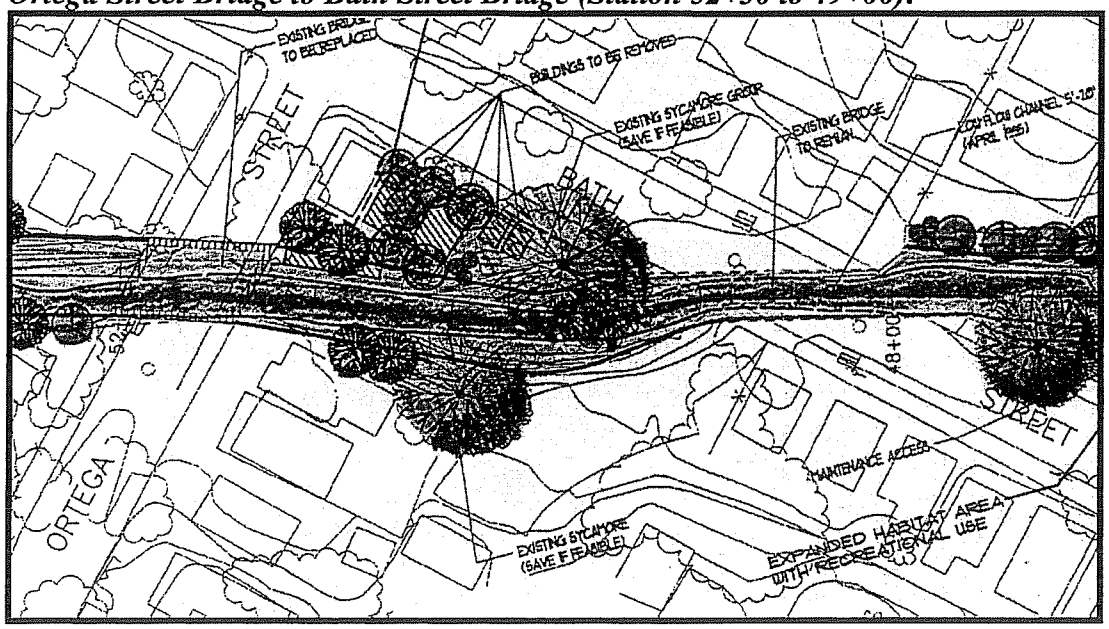


Figure 3.5.2.1-7 - Ortega Street Bridge to Bath Street Bridge

The creek would be 63 feet wide at top of bank along this reach with both banks consisting of vertical wall-riprap sideslope averaging 9 feet in depth. The invert slope would be streamlined, necessitating excavation and removal of one to three feet of streambed. Three residential properties and two garage structures located along the left bank would be removed to allow for creek widening. The only structure that would remain on the left side is located at the corner of Bath and Ortega Streets. The Bath Street Bridge would remain in place and would convey the design flow. The remnants of the acquired properties would be planted with native trees and vegetation, thus creating a habitat expansion zone and, possibly, a passive park space.

Bath Street Bridge to Cota Street Bridge (Station 49+00 to 46+00):

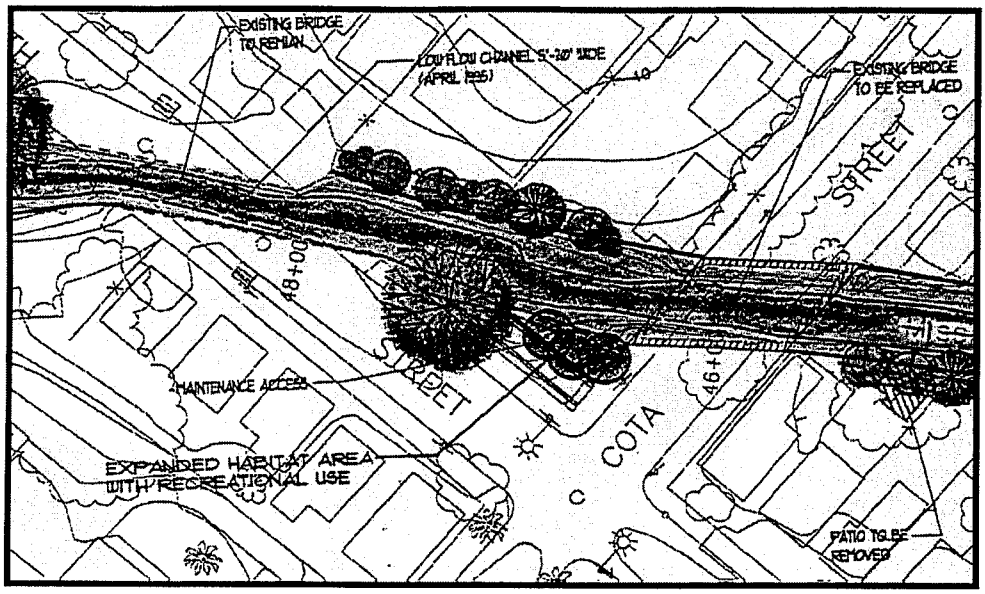


Figure 3.5.2.1-8 - Bath Street Bridge to Cota Street Bridge

This short reach occupies the northeast corner of Cota Street and Bath Street intersection. The creek would be widened to 63 feet at the top of bank. The left bank would be protected with a vertical wall. On the right side, the existing maintenance access ramp fronting Cota Street would be kept in place. Cota Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow.

Cota Street Bridge to Haley-De la Vina Bridge (Station 46+00 to 39+00):

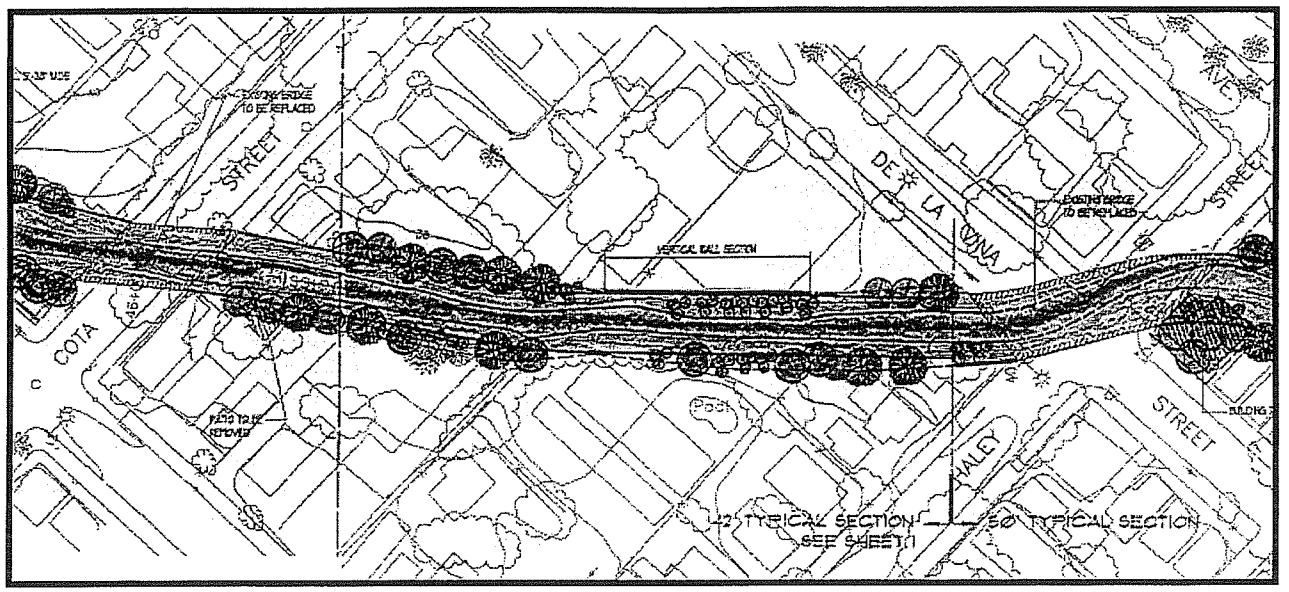


Figure 3.5.2.1-9 - Cota Street Bridge to Haley-De la Vina Bridge

The upper half of this reach (Cota Street Bridge to Station 43+00) would be 63 feet wide at the top of bank with both sides consisting of vertical wall-riprap sideslope, except for a short reach immediately downstream of the Cota Street Bridge where vertical walls would be used to preserve a culturally significant structure. On the downstream half of the left side, the bank protection would transition from a toe wall-riprap sideslope into a vertical wall across the multi purpose property (Apartment and Hardware store) located between Station 43+30 and 41+70, where the top width would narrow to 55 feet. The invert slope would be streamlined, necessitating excavation and removal of two to three feet of the streambed. This reach would have an average depth of 9 feet. A patio deck located at 532 Bath Street would be removed to allow for creek widening. The Haley-De la Vina Street Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow.

Haley-De la Vina Bridge to Gutierrez Street Bridge (Station 39+00 to 34+00):

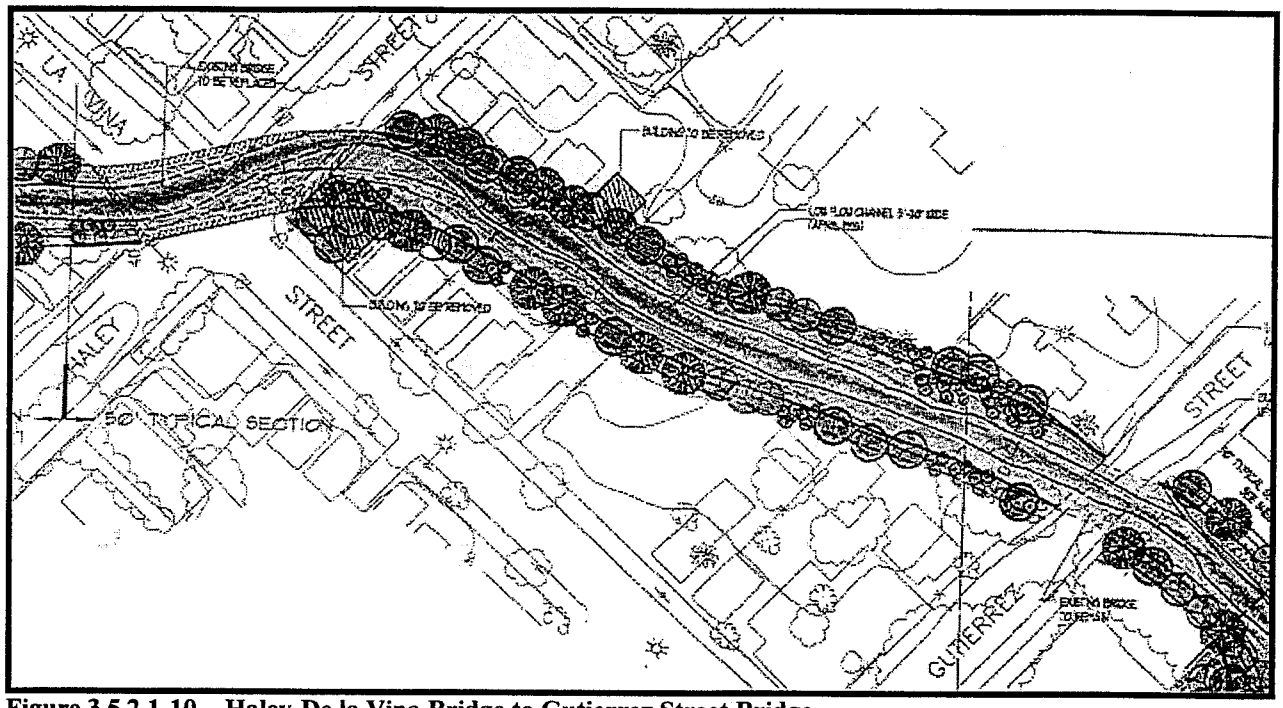


Figure 3.5.2.1-10 - Haley-De la Vina Bridge to Gutierrez Street Bridge

The creek would be 71 feet wide at the top of bank along this reach with both banks consisting of the toe wall-riprap sideslope, except for a short reach on the east side immediately upstream of the Gutierrez Street Bridge, where a vertical wall would establish a transition from the east bank into the bridge. The reach would have an average channel depth of 9 feet. The invert slope would be streamlined, necessitating excavation and removal of two to four feet of streambed. Two residential properties located at 434 De la Vina Street and at 119 West Haley Street (Parcel Number 037-203-02) would be removed to allow for creek widening. The remnants of the 434 De la Vina Street property would be planted with native trees and vegetation, thus creating a habitat expansion zone and, possibly, a passive park space. Approximately 150 feet of streambed immediately upstream the Gutierrez Street Bridge would be armored with riprap and a cluster of boulders to act as energy dissipaters.

Gutierrez Street Bridge to Highway 101:

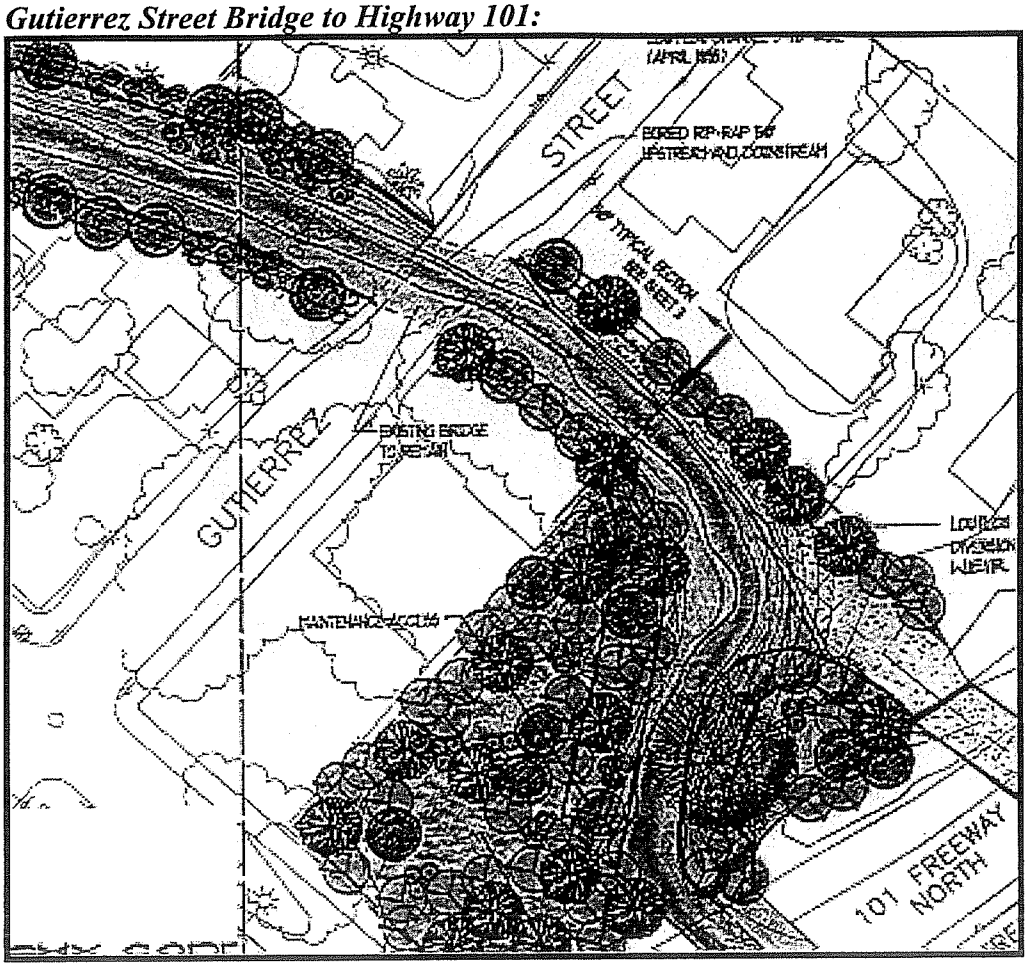


Figure 3.5.2.1-11 - Gutierrez Street Bridge to Highway 101

The reach from Gutierrez Bridge to Station 32+50 (beginning of CalTrans property) would continue to be 71 feet wide at the top of bank with banks consisting of the toe wall-riprap sideslope. A low flow diversion weir would run along the left side and connect to the overflow culvert near the upstream face of Highway 101. The depth of the creek along this reach would average about 9 feet. The toe wall-riprap sideslope on the right bank would terminate just inside the CalTrans property line, about 120 feet downstream of the Gutierrez Street Bridge. The remaining section of the right bank would be protected entirely with riprap. Approximately 150 feet of streambed immediately upstream and downstream of the Gutierrez Street Bridge would be armored with riprap and a cluster of boulders to act as energy dissipaters.

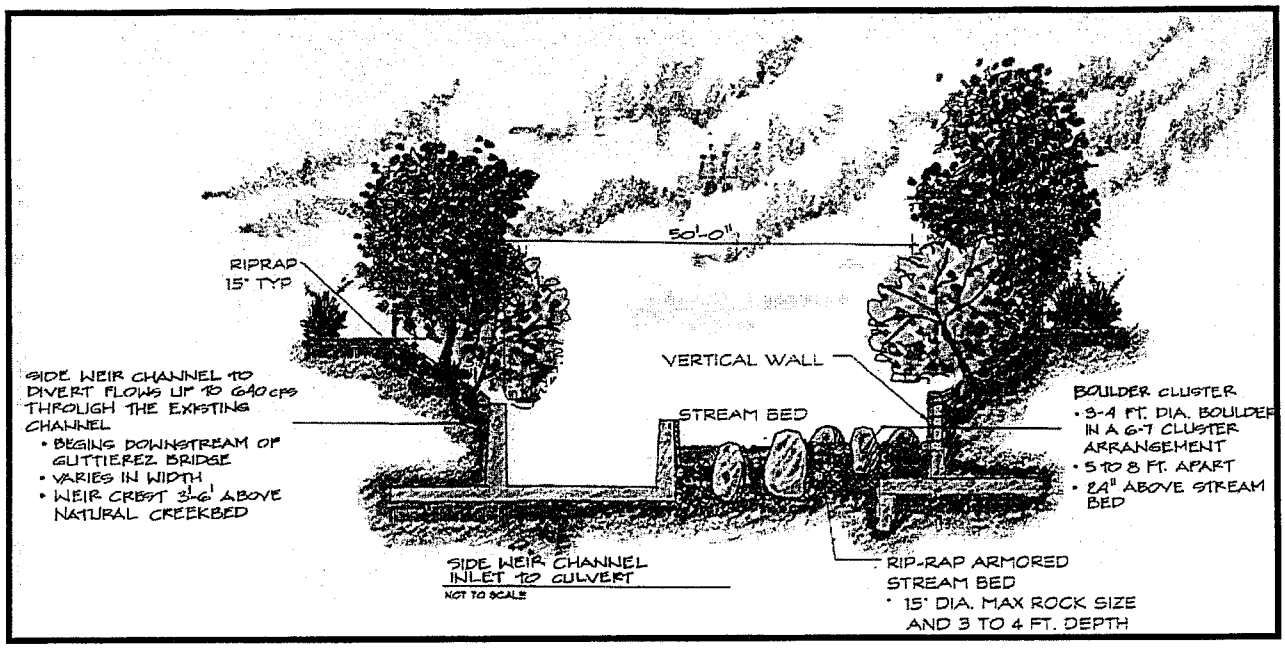


Figure 3.5.2.1-12 - Representative Cross Section of the Side Weir Channel Inlet to Overflow Culvert

The higher flows across this reach would be divided between the existing channel (oxbow) and the overflow culvert. The oxbow would continue to convey the base flow and low-discharge events up to 640 cfs (equivalent to an event with 2.3-year return interval). During larger events, the new culvert would be expected to carry two-thirds of the design capacity, while the remaining third would be conveyed by the oxbow. No modifications would be needed for the oxbow between Highway 101 and the Chapala Street Bridge.

New Overflow Culvert that Bypasses the Oxbow between Highway 101 and Chapala Street Bridge:

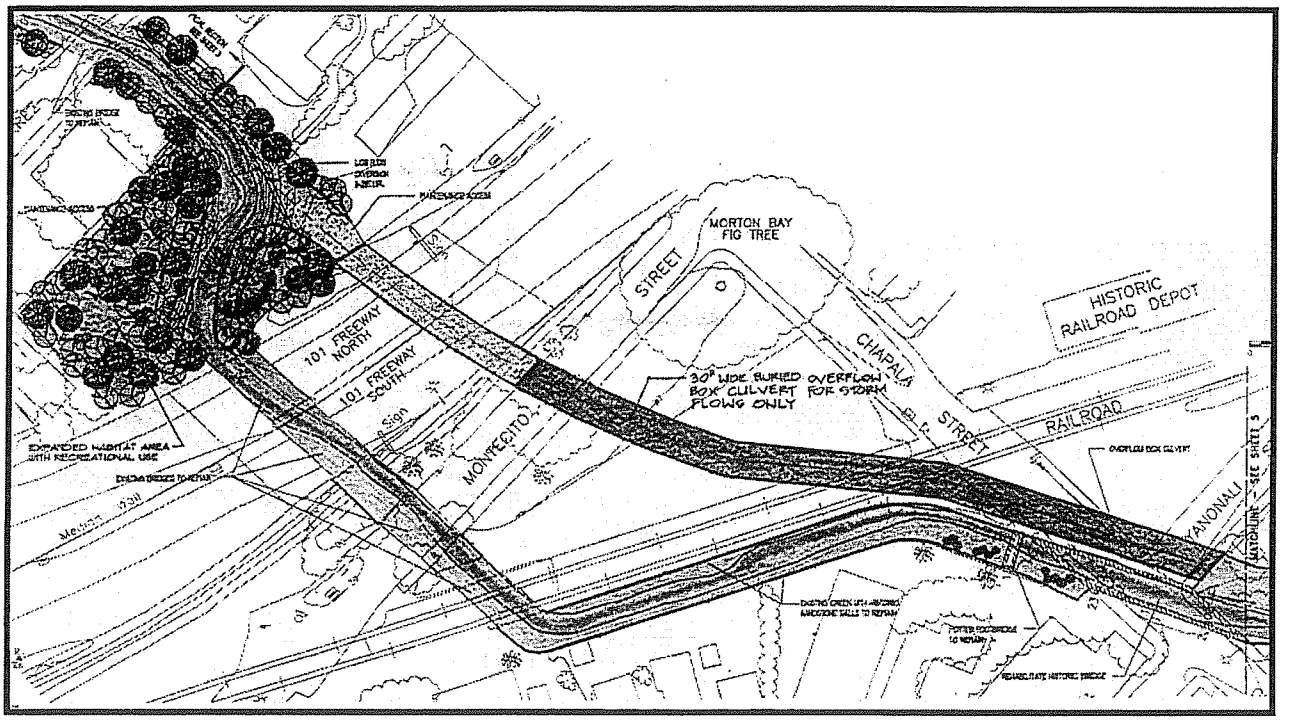


Figure 3.5.2.1-13 - New Overflow Culvert that Bypasses the Oxbow between Highway 101 and Chapala Street Bridge

Across the existing opening underneath Highway 101 (built by Caltrans in the 1980s), the new culvert would be a pair of 15 foot wide by 6 foot high open channels. Below Highway 101, the culvert would be covered before it crosses Montecito Street and until it terminates alongside the downstream end of the Chapala Street Bridge. The open channel would be approximately 200 lineal feet while the covered section would be approximately 640 lineal feet. The covered portion of the culvert would cross under the Amtrak passenger platform before crossing under the railroad tracks. The box would remain covered as it runs along the left side of the sandstone channel. It would continue alongside the Chapala Street Bridge and terminate at the downstream end of the bridge. Approximately 50 feet of streambed immediately downstream of the overflow culvert outlet would be armored with riprap to present scorning of the bottom. In order to avoid any potential impacts to the Moreton Bay Fig tree, the culvert is aligned approximately 50 feet outside of its dripline.

Chapala/Yanonali Street Bridge to Mason Street Bridge (Station 25+00 to 17+00):

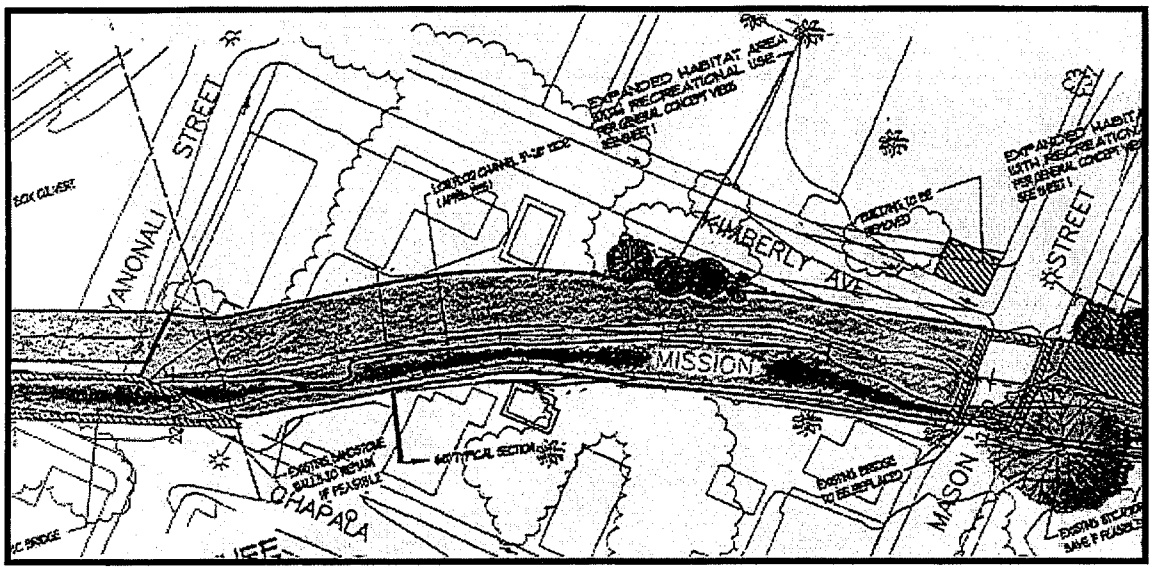


Figure 3.5.2.1-14 - Chapala/Yanonali Street Bridge to Mason Street Bridge

The creek banks would be predominantly vertical walls on both sides, except for approximately 120 lineal feet of the left (east) bank just upstream of the Mason Street Bridge. This portion would be protected by the toe wall-riprap sideslope. The riprap slope will be laid back to cover the entire parcel and create an expanded habitat zone. The creek would be 60 feet wide between the vertical wall sides and 71 feet wide at the top of bank where the toe wall-riprap sideslope is used. This reach would have an average depth of 7.5 feet. The invert slope would be streamlined, necessitating excavation and fill of about one foot of streambed. The Mason Street Bridge would be rebuilt and sized to accommodate the higher-than-existing design flow. In order to widen the creek and rebuild the bridge, Kimberly Avenue would be partially realigned, which requires the removal of the commercial structure (APN 033-075-006) located at the corner of Kimberly Avenue and Mason Street.

Mason Street Bridge to State Street Bridge (Station 17+00 to 12+50):

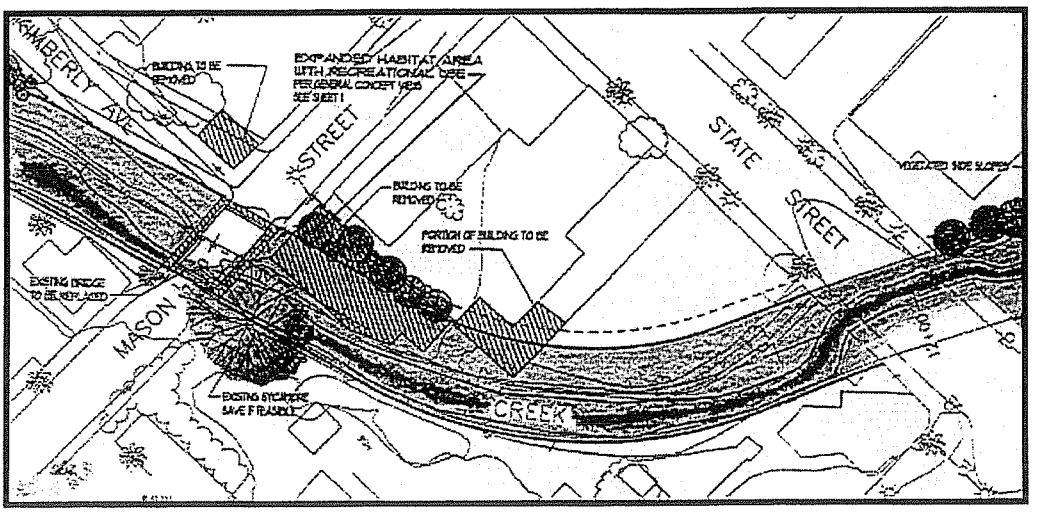


Figure 3.5.2.1-15 - Mason Street Bridge to State Street Bridge

The creek banks would be predominantly vertical walls between Mason and State Streets, except for the left bank immediately downstream of the Mason Street Bridge, which would consist of the toe wall-riprap sideslope. The property located at 15 W. Mason Street would be removed to allow for widening of the creek. The remainder of this lot would be planted with native trees and vegetation, thus creating a habitat expansion zone and, possibly, a passive park. Another structure located on 29 State Street would be partially removed. The remainder of this structure would continue to function as a commercial establishment. The creek would be 60 feet wide between the vertical wall sides and 71 feet wide at the top of bank where the toe wall-riprap sideslope is found. The average depth along this reach would be 8 feet. The invert slope would be streamlined, necessitating excavation or fill averaging one foot in depth. The State Street Bridge would remain to convey the 3400-cfs design capacity.

State Street Bridge to Cabrillo Boulevard Bridge (Station 12+50 10+15):

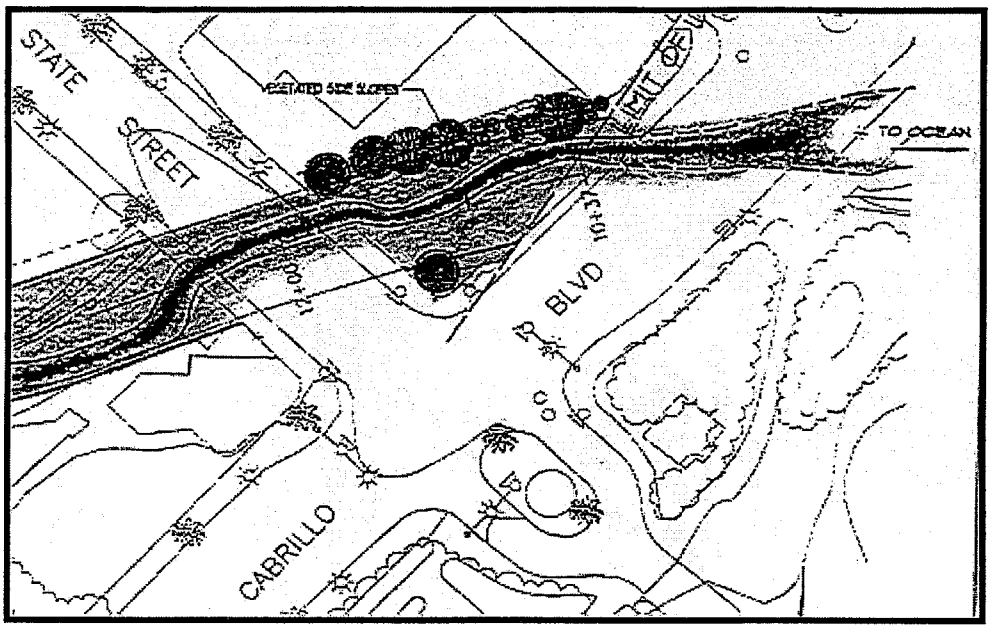


Figure 3.5.2.1-16 - State Street Bridge to Cabrillo Boulevard Bridge

The banks across this short span, located at the corner of State Street and Cabrillo Boulevard, would consist of the toe wall-riprap sideslope. The invert would be cleared of leftover footings from earlier structures. The creek would be widened to approximately 65 feet at the top of bank and is not expected to have any impacts on the adjacent structures. Cabrillo Boulevard Bridge would remain in place and convey the 3400-cfs design capacity. This is essentially the downstream boundary of the project and any associated construction activities. The lagoon is located immediately downstream of the Cabrillo Boulevard Bridge, a short reach before the shoreline of the Pacific Ocean.

Pilot Channel:

The project's design for the creek's invert includes scoring a "pilot channel" into the bottom as the last element of construction. Otherwise the streambed would be a uniformly flat expanse of native sediments between the toe walls. This pilot channel would constitute a permanent component of the instream habitat between Canon Perdido and Highway 101, although one possibly given to positional shifts as the finished creek bed evolves. No pilot channel would be fashioned into the creek bed below Yanonali Street. Between Yanonali and Mason Streets periodic tidal ebb and flow would largely negate the intended purpose of such a

channel, and below Mason Street the tidal movements would very quickly would make it thoroughly ineffective.

Initial alignment of the pilot channel would be planned in accordance with positions of fish ledges. Fish ledges would be constructed at the outside of bends of flows patterns to insure water impinging against them and thereby scouring persistent pools beneath them. Close to ledges, the pilot channel would be aimed toward them. In the reaches between ledges, the pilot channel would be scored to follow the likely path the stream would tend to establish on its own. During Preconstruction Engineering & Design (PED) a channel stability assessment study would be performed to estimate the alignment or path of a pilot Chanel.

A pilot channel large enough to carry at least 50 ft^3/sec would be adequate to carry water along the preferential innate course. Its physical size and shape would also be determined after final hydraulic analyses, but would probably be trapezoidal in appearance and 10 to 12 feet wide and about 1 foot deep. Such a configuration would leave ample freeboard for the low flows which typically move down Mission Creek from late spring through early winter. The channel would be enriched with representative types and gradations of the larger native substrates — coarse gravels, small cobbles, and rocks or boulders as currently exist within Mission Creek.

R **Structural Features to Mitigate and Avoid Impacts to Biological Resources:**

Several structural features would be included to avoid and mitigate impacts to biological resources. These permanent and durable mitigation features would create hiding places where fish may take refuge. They would be composed of four separate structural elements formed by coarse surface relief of the walls (goby refugia), artificial overhangs projecting from the walls (fish ledges), and placing double rows of coarse boulders (fish baffles) between the overhangs along the creek walls (See Figure 3.5.2.1-18) and rock energy dissipators. In combination, they should provide shelter for fish of all sizes.

Rock Energy Dissipators:

Rock energy dissipators would be located in two reaches (See Exhibit 64, Sheets 1-5 of the Main Report for locations). In areas where undesirable high velocity flows could be expected, the streambed would be armored with riprap and bolders (see Figure 3.5.22).

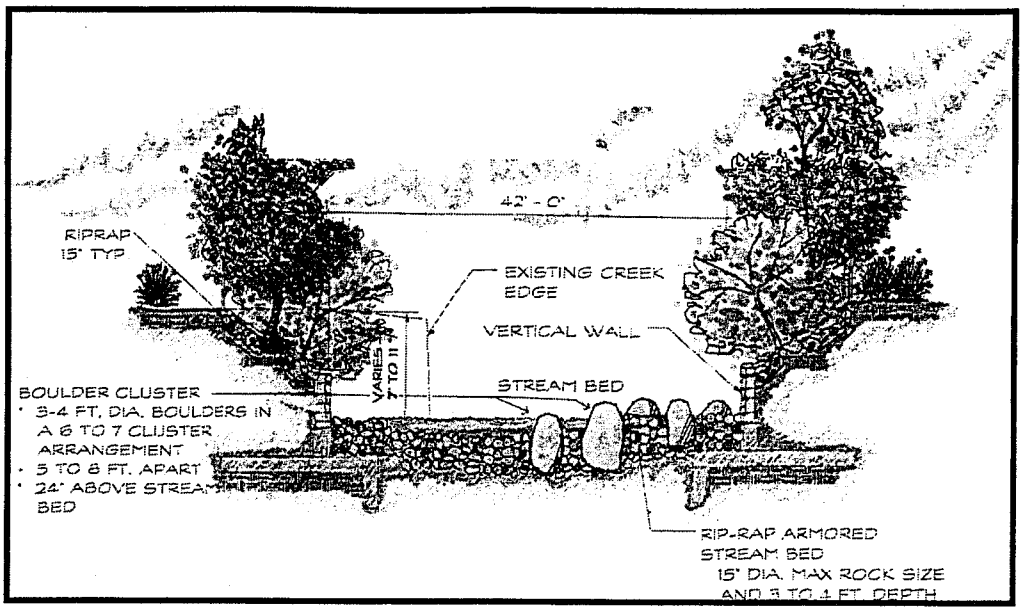


Figure 3.5.2.1-17 - Representative Cross Section of Rocky Energy Dissipaters and Boulder Clusters

Fields of large boulders would be embedded into the bottom at these two locations. The more upstream field would be placed from Canon Perdido Street to below the Ortega Street Bridge. The second would extend from upstream of the Gutierrez Street Bridge to the upper bend of the natural oxbow, immediately upstream of US Hwy 101. The rock energy dissipators would have two functions. First, they would dissipate the force of currents at vulnerable places along the creek. Second, they would impart natural turbulence and heterogeneity to the stream as a means to improve the aquatic habitat for steelhead (*Onchoryhncus mykiss*), an endangered species known to migrate through this reach of Mission Creek.

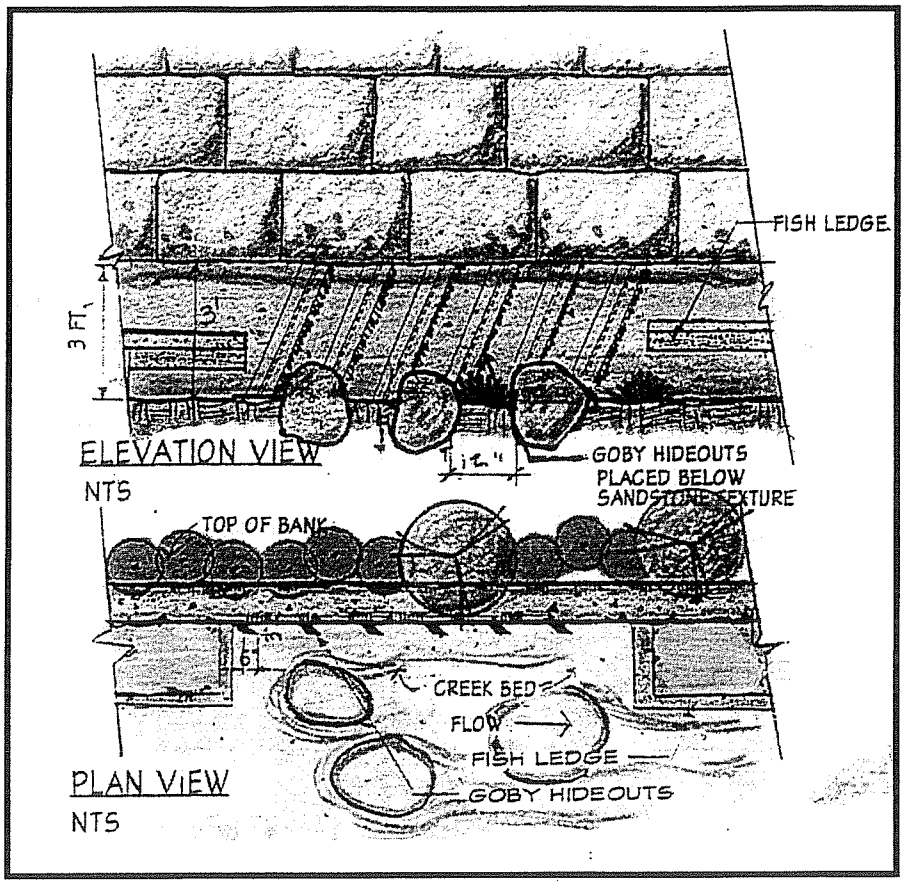


Figure 3.5.2.1-18. Goby Refugia, Fish Ledges and Fish Baffles Along the Walls in the Estuary (Between Mason Street and Cabrillo Boulevard)

The combination of these three features would be used within the estuary between Mason and State Street Bridges. The goby refugia and the fish baffles would be used for the remainder of the project reach. The locations of these features are shown on Exhibit 4, Sheets 1-5 of the Main Report.

The goby refugia where gobies and other small fish could escape strong currents would be made in a pattern of slanted ribs as illustrated. These molded ridges would extend from the ordinary high water mark to the bottom of the formed wall, roughly eight feet in vertical length. Most of the time water in the estuary would cover them completely and each would extend well below the streambed. Lower velocity and localized eddy currents would exist around these ribs, primarily caused by the effects of protruding ribs on the boundary layer adjacent to the wall itself. Small fish the size of gobies would easily find the recesses on their downstream side and take advantage of the refugia from currents created by these mitigation structures.

Fish Ledges:

The second component of structural mitigation features, intended primarily for steelhead and other large fish, would consist of projecting ledges (fish ledges). The ledges would cantilever from the wall 2 feet into the flow, be 6 inches thick, and roughly 50 feet long typically. Within the estuary, cantilever ledges would be built at varying heights, say 10 to 20 inches, above the invert of the streambed and substantially below the ordinary high water level. Water would cover these ledges at all times except during the lowest low tides and all fish could easily swim beneath them.

The space between successive fish ledges allows a third mitigation measure. A double row of large, angular rocks would be nestled together and placed against the wall at the foot of the ribs. Ranks of boulders would extend into the creek about 5 feet from each wall. The innumerable crevices, voids between rocks, and spaces between rocks and the wall itself formed in this orderly jumble would provide natural habitat for small fish and invertebrates. A fraction of those spaces should prove large enough for steelhead smolt also to find shelter amongst the rocks.

Ribs, boulders, and ledges would line both sides of the estuary between Mason Street and State Street. Ribs and boulders only would extend from State Street to Cabrillo Boulevard. All surfaces in this section of the project would have all three features intermixed, although a ledge on one wall would face ribs and boulders on the opposite wall (accompanying figure, where ledges are not drawn to scale length). Lengths of the walls allow 380 linear feet of fish ribs and boulders and 240 linear feet of overhanging ledges on the left hand side; 360 linear feet of fish ribs and boulders and about 300 linear feet of ledges on the right-hand side.

Fish Ledges upstream of Mason Street. Overhangs of like design would be placed along the riverine sections of the creek (including the length between Mason and Yanonali Streets, otherwise treated as the upper end of the estuary) where currents should impinge against the wall and scour persistent holes under these ledges. Adult steelhead would have access to these pools during upstream migration. All manner of aquatic animals would take advantage of these sheltered pools throughout the dry season.

Walls on both sides of the creek would have fish ledges, placed as indicated by current patterns (locations are shown in Exhibit 4, Sheets 1 through 5 of the Main Report). Four would be built along the left hand side (approximately 200 linear feet, in total) and five constructed against the right hand side (total of 250 feet in length).

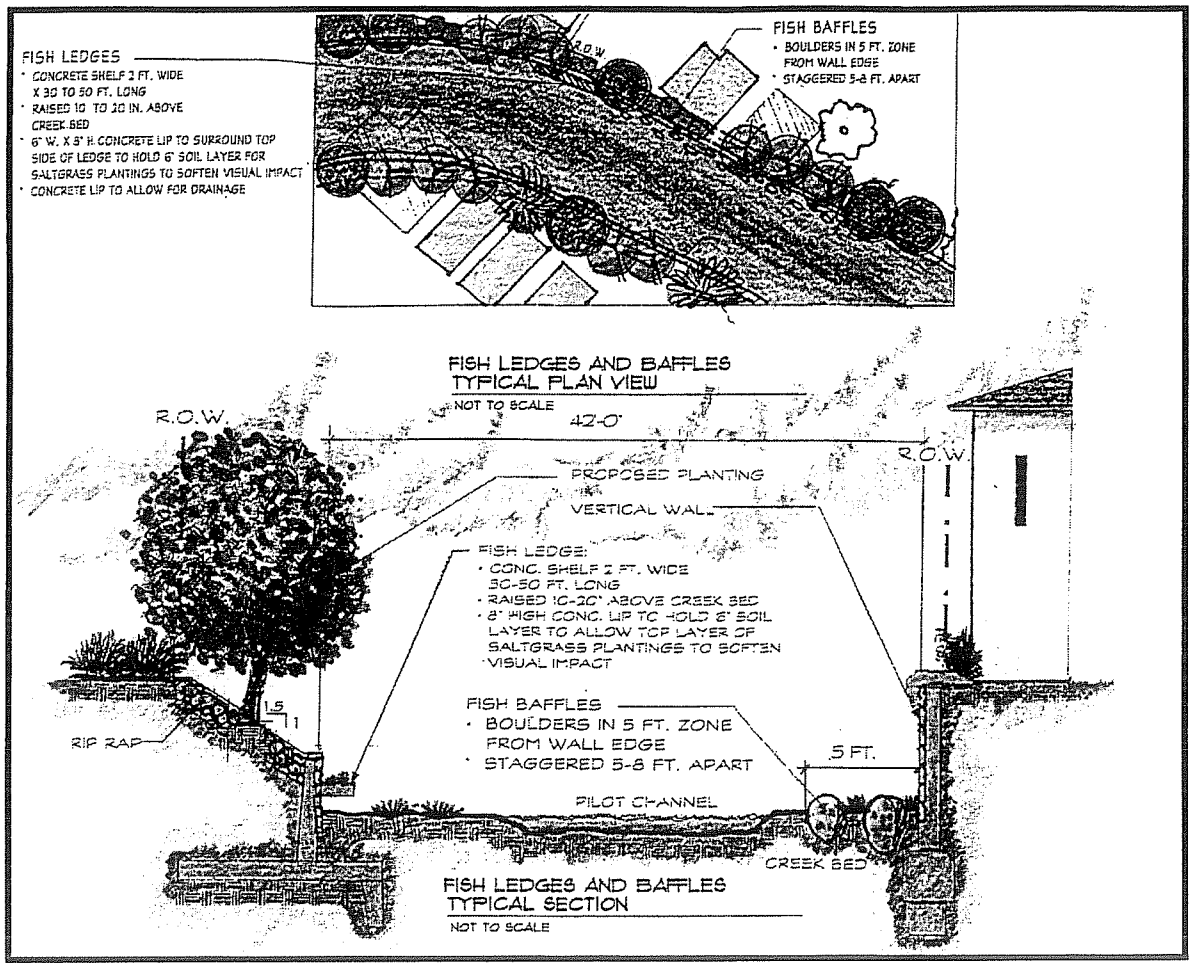


Figure 3.5.2.1-19. Representative Cross Section Showing Fish Ledges and Baffles along the Walls Upstream of Mason Street

Fish baffles upstream of Mason Street. Arrays of large boulders placed to the inside of walls would impart diverse flow patterns and a valuable measure of aquatic heterogeneity, lacking which, the creek's streambed would mostly resemble an unrelentingly flat surface characterized by steady sheet flows. Their mass and position adjacent to the wall, and thereby within the boundary currents inherent to sides of the channel, would minimize the incidence of currents dislodging them.

Each baffle would consist of a rank of large rocks or derrick stone placed touching the inside surface of the walls, with a second rank inside the first and closer to the creek. Rocks would stand proud of the streambed by 18 to 24 inches. Together, the two ranks would extend inward toward the creek approximately 5 feet. A space of 5 to 8 feet would separate individual

rocks, or perhaps pairs of boulders, to facilitate periodic removal of sediments from between them.

Fish baffles would occupy locations in lower velocity sections of the creek, on one side or the other as appropriate to its curvature (locations are shown in Exhibit 4, Sheets 1 through 5). In certain lengths of the creek side baffles would be placed along one side only, then for another length be built against the opposite side. Many baffles would extend along 150 feet of the creek's side, a few up to 200 feet in length, while others would be shorter by necessity. Design restrictions prevent their placement beneath bridges, for a certain distance on the upstream side of bridge abutments, and directly opposite other baffles or ledges.

The creek's channel allows fish baffles to be interspersed with ledges as indicated by the prevailing direction of currents and streambed to encourage formation of varied stream features. Side baffles would be installed over approximately 1400 linear feet of the stream's edge; 675 linear feet of fish baffles on the left and 725 linear feet on the right side.

In-Stream Boulder Clusters. Baffle structures the full width of the streambed and 300 feet in length would combine clusters of large boulders and fields of riprap at two locations; immediately upstream and downstream of the De la Guerra and Gutierrez Street Bridges as shown in Exhibit 4, Sheets 1 through 5 of the Main Report.

Stone used for riprap would be as large as 15 inches in diameter and of angular character. Larger boulders, essentially individual derrick stones of 3 to 4 feet diameter each, would be set down into the surrounding riprap, placed 5 to 8 feet apart, and arranged in clusters of 6 to 9 individual boulders. Tips of the rocks would protrude 1½ to 2 feet above the streambed.

The boulder patches would constitute islands of very coarse and permanent streambed irregularities. Upstream of them, Mission Creek would tend to flow as a homogenous, single current. By their placement, these clusters ought to disrupt that flow regime and induce smaller and intertwined subcurrents. These many smaller currents should continually reshape the longitudinal profile over the length of the baffles fields and downstream of them for some way.

Each cluster of boulders would naturally form various internal cross currents and protected patches of water. Placement of clusters within the baffle is intended to promote the variety of water conditions trout seek out in natural streams, so clusters would be placed to outline a sinuous and meandering predominant channel, one that shifts back and forth across the streambed.

Material Required for Construction:

Material required for project construction would include earth-fill material; concrete for walls, footings, and the box culvert; rocks/riprap for slope protection; steel reinforcement for concrete support; filter material; fencing material; top soils; planters; and material required to establish vegetation. Most of the material would be obtained from a distance of about 5 to 10

miles radius from the project area, except rocks/riprap. Riprap may be obtained from existing quarries located within about 50 miles. Table 3.5.2-1 provides type, amount of material, distance to be transported, total number of truck trips and estimated truck trips required per day to transport construction related material.

About 17,000 to 18,000 cy of excavated material from the creekbed and banks would be utilized during project construction as fill material. Backfill material would be transported to the project site on an as-needed basis. It is estimated that about 50 to 100 cy material would be required each day for the period of project construction. Therefore, about 3 truck trips would be required to transport the backfill material to the construction site. Maximum one way travel distance would be about a mile.

Duration of Construction:

Project construction, including the proposed creek improvements, oxbow culvert, and bridge replacements, is expected to take a minimum of two years to complete. During construction, excavation activities would not be carried out during heavy storm or rainy season. Every effort would be made to complete the project construction within two years. However, due to weather conditions/seasonal heavy rainfall, mechanical failure, or funding constraints, the project construction could be delayed. In that case, project construction could take up to three or four years to complete. Project construction is scheduled to begin in mid-2003.

Project construction would not occur within the flowing water between mid-December through March to avoid potential impacts to adult steelhead, a Federally listed species. Between April and the end of May, a qualified biologist would monitor locations upstream for the presence of young steelhead preparing to swim down to the ocean. By agreement with the NMFS, construction would be allowed between April 15 and June 1 provided that there is no continuous surface flow (water more than ½ an inch deep) occurs between Oak Park and the project area. Either the USACOE or an environmental contractor would fulfill this monitoring commitment. Temporary, brief suspensions of construction could occur during these two months.

Staging / Stockpiling Areas:

The proposed staging area would be located north of Highway 101 adjacent to the channel with access from De la Vina Street. This area could also be used for construction access. Another possible staging area would be located north of the channel between the railroad and Yanonali Street. Additional access points could be at State Street, Mason Street, Montecito Street, Cota Street, Bath Street, Ortega Street, and north of De la Guerra Street. At these staging areas, the selected contractor would install temporary trailers with sanitary facilities. Small quantities of material excavated (about 3000 to 4000 cy) from the creekbed would be stockpiled at these local staging areas, but the majority of it would be transported to the remote

stockpile/disposal site, about 20 miles from the project area. Material would be processed on site to be used for the project construction. Suitable material, about 18,000 cy, would be utilized in the project construction. See plans located at the end of the section for the staging area location.

The staging area is a part of the project description. The staging area is located along the creek banks. The staging area is marked on the plans located in the Main Report. Impact analysis of the staging area is incorporated in the alternative analysis. Except for biological resources, no separate impact analysis has been provided for other resources.

TABLE 3.5.1-1
CONSTRUCTION MATERIAL
AMOUNT OF MATERIAL AND RELATED TRUCK TRIPS

Type and Amount of Material	Total Number of Truck Trips	Travel distance per truck trip	Total # of Truck Trips (360 days)
Total backfill Material 18,000 Cy	900 (Total Truck Trips)	1/4 mile	3 truck trips/ day
Concrete 13,000 C.Y	650 (Total Truck Trips)	5 mi-one way-10 mi-two way	2 truck trips/ day
Steel reinforcement 1,640,160 lbs	3000 (Total Truck Trips)	5 mi-one way-10 mi-two ways	8 truck trips/ day
Riprap 3,560 tons	560 Total Truck Trips	50 mi-one way-100 mi-two ways	About 1 truck trip/day
Planting Material: Top Soils -1,052 Cy 12" dia. Planters - 420 36" dia Planters 1,015 33,210 sq. ft. of shoring (wood)	About 50 Total Truck Trips About 2 Truck Trips About 12 Total Truck Trips 20 Total Truck Trips	5 mi-one way -10 mi- two ways 10 mi-one way - 20 mi-two ways 10 mi-one way - 20 mi-two ways 10 mi-one way - 20 mi two ways	About 1 truck trip/ day
6,920 linear feet fencing	15 Total Truck Trips	5 mi-one way -10 mi-two ways	1 truck trip/ day

Equipment for Construction:

For the project, construction equipment would include bulldozers, grader, trencher, crane, off-highway trucks, water trucks, etc. Most of the equipment would be used for 8 hours a day. The equipment would be stored at the staging area. The following paragraph provides numbers and details regarding construction related equipment.

- *Safety Equipment* (throughout construction)
- *Dumpster (1)* (throughout construction)
- *Pickup Trucks (3)* (Eight hrs/day throughout construction)
- *C10BO003 BP 10/36 Vibratory Plate*, 14.2" X 21.5" Plate (Compactor) 4 hp
- *(4) 12 Cy Bucket (Excavator) , LTWT, Crescent Scrapers* - 250 hp (Eight hrs/day throughout construction).
- *(3) Concrete Vibrators* 2.50 D EL,HI-FREQ - 120 hp
- *(2) Hydraulic Cranes*, truck mounted, 60 ton/115' Boom - 350 hp
- *(5) Generators*, 5.5 KW, 120/240V, Portable - 20 hp
- *(4) Bulldozers*, D-9N, PS (Add-Blade)
- *(3) Concrete pumps* 25 cy/hr. trailer mounted - 30 hp
- *(4) Fork Lifts* 2500# @24" Load Center, 13.50' L-HT - 18hp
- *(2) Graders* - Articulated Frame, Powershaft - 135 hp
- *(4) Stumper* 18" dia. wheel, trailer mounted - 34 hp for land clearing
- *(2) Flail mower*, 68" wide, 4" HT 1" CAP (Add 30 hp tractor) (Three months use for 8 hrs./day)
- *(3) Hydromulcher*, 3000 gal. for hydroseeding plus 56,000 GVW Truck - 250 hp (3 Months, 8 hrs./day)
- *(1) Groundmaster* 62" deck w/118 TRACTOR 17 hp
- *(2) Trenchers* 24" deep x 4' wide, walk behind 13 hp (8 Hrs/day- throughout construction)
- *(7) 18 cubic yard off-highway trucks* - 335 hp (throughout construction)
- *(3) 5,000 gallon water trucks* - off/highway 175 hp (throughout construction)
- *(8) passenger vehicles* (throughout construction)

Construction Crew:

About 20 to 30 construction crew members would be required to construct the proposed project for a period of about two years. Most of the construction workers would come from a radius of about 20 miles, residing within the City or County of Santa Barbara. Maximum one-way travel distance would be about 20 miles. It is estimated that about 20 to 30 passenger vehicles would be used by the construction crews for commuting during the duration of the construction. It is estimated that construction would take about 2 years (about 440 working days).

Haul Routes:

Hauling of materials and equipment to and from the project site would primarily use Highway 101 and the three nearby on/off ramps. Carrillo Street on/off ramp is located near the upstream end of the project, while Castillo Street on/off ramp is near the lower end and provides the most direct route to the proposed staging and stockpiling sites. Access and haul routes from the staging and stockpiling sites to the specific creek construction site would use streets that are nearest to the creek, taking the most direct route. Above Highway 101, it is expected that De la Vina, Castillo, and Bath Streets would generally be the main haul route to and from the staging area, while Castillo, Montecito, Yanonali, Mason, and State Streets would provide the main access during construction downstream of Highway 101.

Invert Access Ramps:

Approximately three access ramps would be designed to access the channel bottom for construction and maintenance. The location of these would likely be at the following locations:

Canon Perdido: Located on the north side downstream of Canon Perdido Street. Access would be from the adjacent parking lot.

Bath Street: South side downstream of the Bath Street Bridge. Access would be from Cota Street.

Gutierrez Street: South side downstream of Gutierrez Street. Access would be from De la Vina Street.

3.5.3 Operation and Maintenance

3.5.3.1 Existing Operation and Maintenance:

Santa Barbara County currently performs routine maintenance of Mission Creek, including the proposed project reach. Maintenance activities include: removal of debris/sediment, streambed vegetation, and urban trash (including large items such as shopping carts, water heater tanks, and other household items); channel desilting and shaping; and application of herbicides to control obstructive vegetation. Typically, sediment removal has occurred prior to the beginning of the rainy season unless channel inspection determines that sediment removal is unnecessary. Channel shaping has been performed using heavy equipment such as dozer or loader and crane. Removed sediment has been transported to one of the CalTrans stockpile areas. Santa Barbara County has prepared a Program EIR and Addendum to the Programmatic EIR (Santa Barbara County Flood Control Routine Maintenance, 1997). The environmental resources have been

described in both documents. Mitigation measures have been identified in these reports to minimize impacts to environmental resources.

R 3.5.3.2 **Future Operation and Maintenance:**

Perpetual maintenance of the creek is an integral part of the Recommended Alternative (Alternative 12). To ensure and maintain its design function and form, some maintenance to maintain the design capacity of the channel would be needed on a regular basis. Any areas where sediment deposition and/or vegetation growth occur beyond 15% of the channel capacity would be required to be removed to maintain the capacity of the project reach. Future maintenance would also include maintenance of the structures such as cleaning of oxbow culverts, repair of vertical concrete walls and riprap (bottom riprap lining and baffle piers), structures for mitigation, and maintenance of planted vegetation (after initial establishment required as part of project construction). It is estimated that the frequency of sediment removal would be at an interval as often as once a year. However, when several low-flow years occur sequentially, sediment removal might occur every two to three or more years. Floodflows and debris accumulation and removal would continue to impact channel vegetation and aquatic resources. Over time, pools and riffles that provide aquatic habitat would reestablish in the channel.

Impact analysis for future maintenance is included in each resource is discussed in this EIS/EIR. Impacts related to maintenance activities are addressed in Sections 6 through 19. Mitigation measures for future operation and maintenance for the life of the project are included in this EIS/EIR. Conditions identified in the EIS/EIR would be followed during each operation and maintenance activity. A brief description of each activity is provided in the following paragraphs.

Future Maintenance of the Pilot (Bank-full) Channel:

The need for maintenance of the creek's capacity will occur after completion of the project. When or if, sedimentation in any reach particular project reach in the project area exceeds 15% of the flow capacity. When maintenance needs do not dictate removal of sediments, the County Flood Control District would not alter the currently existing pilot channel, but instead only would cut such vegetation as has begun to grow to unacceptable size. When sediments must be removed during the course of normal maintenance activities, the County would finish the work by reconstructing the pilot channel. This rebuilt channel would deliberately follow whatever course the creek had imposed on the original alignment of the pilot channel. In this fashion, the pilot channel would reflect an alignment that came about through natural processes, and which would be optimally efficient in the transport of sediments during low flow times of the year. The maintenance cycle would conclude by enrichment of the rebuilt channel with representative types and gradations of the larger native substrates.

Channel Shaping and Channel Desilting - Sediment removal:

The Corps of Engineers performed a sediment transport budget analysis for the recommended plan. The general results indicated that there would be localized areas throughout the project reach that would experience either sediment deposition or erosion/scour conditions. An approximate qualification of these processes for with- and without project conditions is summarized and presented in respective sediment budget tables found in Appendix B - Hydraulics.

The change from existing conditions to design conveyance capacity would alter the net sediment budget for the entire project very slightly. A net total of 25 yd^3 should accumulate each time the creek carries an average storm event. In contrast, individual higher peak flows should promote net erosion from the streambed, 35 yd^3 during a 5-year storm event and roughly ten times that quantity removed during a single design event. Future sediment accumulation is dependent upon the size and number of storm events. However, the future maintenance would be similar to the existing maintenance performed by Santa Barbara County. As an example of maintenance activities, the last time the County removed about 350 cy^3 sediment between Canon Perdido Street and Highway 101 in summer of 1997. Evidently, no sediments were removed from the sandstone channel (between Montecito and Yanonali Streets) at that time. No maintenance of any kind had been performed in the estuary (between Yaonali Street and Cabrillo Boulevard). No malignance would be required within estuary.

Duration of Future Operation Maintenance:

Usually, sediment removal would occur only when the flow of water approaches the seasonal minimum, i.e. between mid-August and mid-October. Operation and maintenance would not occur between December and March to avoid impacts to steelhead and tidewater gobies, both Federally listed species. However, in the case of a heavy storm event, operation/maintenance of the channel invert could be required between December and March. If maintenance work occurs during these months in flowing water, a qualified biologist would be needed on site to monitor the sediment removal activities. Environmental commitments identified in Sections 6 through 24 would be followed during future sediment removal operations.

Future sediment removal activity may take about 15 to 30 days per year. On average, about 20 truck trips per season could be required to transport deposited material. Material depositing in the creek bed would vary according to the flooding event. Therefore, about 2 to 4 truck trips per day could be required to remove the sediment. Material would be transported to an identified disposal site about 20 miles from the project area, unless mechanical analysis of the sediment shows that the material meets criteria for beach deposition.

It is estimated that the average frequency of sediment removal could be as often as once a year. However, when several low-flow years occur sequentially, sediment removal might occur every two to three or more years. Any areas where sediment deposition and/or vegetation growth occur significantly as to impair the designed conveyance capacity of the creek, clearing shall be performed as soon as possible to restore the creek to its design function and form.. The expected maintenance activities are addressed in the following sections:

Stream Bed Maintenance. Inspection and maintenance of the streambed would address vegetation control, fish baffles, rocky energy dissipater and boulder fields, desilting, and shaping. Vegetation control would be accomplished by either brushing, clearing or spraying. Clearing could be done using a mechanical equipment such as a dozer. Partial removal of vegetation would occur yearly. The removal would follow a mosaic pattern, wherein one half the creek bed would be cleared while the other half would be cleared the following year. The alternate clearing method would be repeated for the subsequent years. Fish baffles, rocky energy dissipaters and boulder fields shall be periodically inspected. Rip-rap or boulders designed to be placed within the streambed shall be replaced back into the intended design location, if removed or dislodged by any means. Maintenance for the desilting and streambed shaping would typically be done with a dozer or loader. Typically accumulated sediment would be pushed to an area where the material can be loaded directly into trucks driving on the channel bottom or to an area where a crane (at the top of bank) can access the material, which could then be loaded into trucks and hauled to a suitable disposal site. It is possible that lesser amounts of sediment could be placed on the riprap slope.

Channel Wall Maintenance. Concrete sections of the channel improvements include decorative variable height concrete walls, goby hideouts on the estuary walls, fish ledges, approaches to bridges. Inspection and maintenance of the channel walls, fish ledges, and the cut stone channel shall address the following:

- Cracking, chipping or breaking, and eroding of the concrete to an extent which might affect the stability of the wall or its water tightness.
- Evidence of settlement, uplift, scour or failure of concrete structures shall be given special attention;
- Necessary steps shall be taken to prevent damage to, or loss of, backfill behind walls through settlement, unauthorized removal of soil and sloughing of soil from adjacent property; and
- Weep holes shall be cleaned on a regular basis. Accumulated debris shall be removed from the front of any weep holes.

Any adverse conditions encountered shall be repaired as soon as possible

Overflow Culvert and Weir Structure. The overflow culvert to bypass high flows around the Mission Creek oxbow will be constructed under Highway 101 (station 25+09 to 30+40). The culvert will be approximately 34' wide (including wall thickness) with a divider wall down the center. A weir will be constructed at the upstream end of the culvert (station 31+00 to station 33+10). The weir will direct lower flows into the oxbow. Higher flows will go over the weir and into the culvert. Inspection and maintenance of the channel walls and the cut stone channel shall address the following:

- Cracking, chipping or breaking, and eroding of the concrete to an extent which might affect the stability of the culvert or its water tightness.
- Evidence of settlement, uplift, scour or failure of concrete structures shall be given special attention;
- Weep holes shall be cleaned on a regular basis. Accumulated debris shall be removed from the front of any weep holes;
- Sediment and debris deposited within the culvert shall be removed. Sediment removal shall be conducted by pushing the accumulated sediment to the inlet and/or outlet where the material can be removed with a crane or excavator.

Any adverse conditions encountered shall be repaired as soon as possible.

Vegetated Riprap Slope Banks and Other Appurtenances. Channel banks above the vertical concrete walls shall be constructed of 15" rip-rap on 1.5:1 slopes with 6" of fill over the rip-rap. Planting pockets (vertical concrete pipes) would be included for various trees and shrubs to provide habitat and ultimately develop a canopy, which would shade the creek bottom. Inspection of the creek banks shall address the following:

- The growth rates of the trees and shrubs shall be documented for 5 years as outlined in the Environmental Commitments discussed in the EIS/EIR. If the plants do not meet pre-determined growth rates, actions shall be taken to improve growing conditions such as fertilization and increased irrigation; Planted vegetation should be maintained by the County for the life of the project.

- Trees and shrubs that do not survive shall be replaced as soon as possible with local stock;

- Rip-rap shall be periodically inspected. If rip-rap is removed or damaged by and means to the extent that the integrity of the project is compromised, it shall be replaced;

- The layer of fill over the rip-rap shall be maintained to encourage understory growth. Periodical soil augmentation on the banks may be accomplished by using deposited streambed sediment or imported soil from other areas. This will typically occur when earthen channel maintenance is required;

- Areas of the bank that are damaged by scour, erosion, or other means shall be replaced as designed as soon as possible. This includes the filter fabric, rip-rap, fill, and plants;

- Obstructive debris shall be removed from the creek banks;

- Non-native vegetation shall be controlled with herbicide and/or removed;

- Access ramps shall be kept clear of debris and obstructions. Grass shall be encouraged on the ramps. Gates at the access ramps shall be locked and kept in good working condition;

- Any damage to fencing and rails along the top of the creek banks shall be repaired as soon as possible; and

- Coordinate trash removal with local volunteer groups or other agencies.

Any adverse conditions encountered shall be documented in the District's Annual Maintenance Plan, the annual re-vegetation monitoring plan, or the annual report.

Habitat Expansion Zone Maintenance: Habitat Expansion Zones shall be created in the vicinity of stations 16+00, 19+00, 38+50, 51+00, and 60+00. Parcels ranging in sizes from 0.03 to 0.52 acres will be planted with native vegetation. The Habitat Expansion Zones will provide riparian habitat along the creek and also provide recreational areas for local residents. Inspection and maintenance of the channel banks shall address the following:

- The growth rates of the trees and shrubs shall be documented for 5 years as outlined in the Environmental Commitments discussed in the EIS/R and/or vegetation should be maintained by the local sponsor for the life of the project.

- If the plants do not meet pre-determined growth rates, actions shall be taken to improve growing conditions such as fertilization and increased irrigation. Trees and shrubs that do not survive shall be replaced as soon as possible with local stock;

- Non-native vegetation shall be controlled with herbicide and/or removed.
- Coordinate trash removal with local volunteer groups or other agencies.

Any adverse conditions encountered shall be documented in the District's Annual Maintenance Plan, the annual re-vegetation monitoring plan, or the annual report.

Mitigation Monitoring Plan located in Appendix H of the EIS/EIR identifies details regarding planting /success criteria, goals and monitoring requirements.

Interior Drainage. Drainage structures, such as stormdrains, are installed through the concrete channel walls and channel banks at strategic locations to pass interior drainage into the channel. The drainage structures such as pipes, headwalls, outlets, etc. shall be maintained to preserve their function.

Inspections. Santa Barbara Flood Control District staff in addition to representatives from regulatory agencies, the Corps of Engineers, and representatives from local public interest groups would conduct periodic inspections to ensure the project is being maintained properly. These inspections shall determine the condition of the various components of the project and disclose any areas that require repair, replacement, or maintenance. Inspections shall occur in the spring after the rainy season, in the fall immediately prior to the rainy season, and after major storms.

The recommendations set forth in this Maintenance Plan shall be incorporated as appropriate into an "Operations and Maintenance Manual" to be prepared by the Corps of Engineers during preparation of final plans for the proposed project.

Removal of Urban Trash:

Lower Mission Creek flows through a densely populated area of the City of Santa Barbara. During site visits, it was observed that litter is common in the channel and adjacent areas, and increases in quantity proceeding south along the channel. Urban trash includes large items such as shopping carts and household items. At every maintenance period, these items would be removed from the project reach to reduce impacts on water quality and biological resources. The local sponsor will also work with other agencies and volunteer groups to provide additional trash removal as needed.

3.5.3.3 **Operation and Maintenance of Structural Features:**

Vertical Concrete Walls:

The vertical concrete walls are designed to be stable and should not require periodic maintenance.

Bottom Riprap Lining and Baffle Piers:

Bottom riprap lining (boulders placed as energy dissipators) and baffle piers at the opening of the high-flow bypass are designed to be stable for the channel design capacity of 3400 cfs and should not require periodic maintenance. Flow conditions exceeding this design capacity may cause possible displacement of stones. After storm flow events exceeding the design capacity, riprap would need to be replaced to the original thickness and grade.

Equipment for Future Maintenance:

Front-end loaders (both full sized and miniature), tracked excavators, mobile conveyor belts, and dump trucks (20 cubic yard capacity) would be appropriate. All equipment would enter and leave the creek only at the identified access points. Refueling and lubrication of equipment would not occur within the stream channel.

3.5.4 **Alternative No. 6: 3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using predominantly vegetated stepped walls with vertical walls applied for the remaining reaches.**

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained and would consist of vegetated stepped banks at a 2:1 (V:H) slope upstream of Highway 101. Below Highway 101, vegetated stepped walls would be applied along the southeast bank, starting from midway between the Chapala and Mason Street Bridges to the State Street Bridge, and along the middle third of the southwest bank between Mason and State Streets. Vertical walls would be maintained for the remainder of this reach. The improved creek would generally follow the existing alignment throughout the project reach. The creek would be 50 to 70 feet wide at the top of the bank and 8 to 12 feet deep. Seven bridges along the study reach would be replaced, including the Ortega Street, Cota Street, De la Vina Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges. Habitat expansion zones are also a project design for this alternative. Future maintenance would remain the same as identified under Alternative 12. This alternative would have all features identified under Alternative 12, except installation of culvert and stabilization of creek banks with vegetated stepped walls. The remaining project description would be the same as identified under Alternative 12. This

alternative also would provide incidental environmental benefit. It would not be as environmentally damaging as fall vertical walls.

Without Oxbow Bypass:

Lower Mission Creek develops a meandering course near downtown Santa Barbara; an oxbow has been developed between Yanonali and Gutiereez Streets. This alternative would involve stabilization of the creek banks and modification of the creek course along the oxbow, including removal of the manmade sandstone channel. Construction along and/or within the oxbow area is called "Without Oxbow Bypass". The location of the oxbow is shown on Figure 3.5-2.

Stepped Walls:

Under Alternative 6, the creek banks would be stabilized by construction of stepped walls instead of riprap. The extent of such walls would vary somewhat. The step would allow planting of appropriate species into spaces filled with soil. These steps would be uniformly five feet wide, which would allow planting of vegetation along the creek banks. Planted shrubby native species along stepped walls would grow to the status of an understory plant community, such as would have been found historically along coastal streams in this region of southern California; however, the associated overstory of large trees would not be included.

3.5.5 Alternative No. 8: 3400 CFS Capacity with Oxbow Bypass - Stabilized sides using vertical walls.

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. The natural bottom would be maintained while bank treatment would consist of concrete vertical walls throughout the project reach. This alternative would incorporate a new culvert, by-passing the oxbow between just above Highway 101 and the Chapala Street Bridge. The improved creek would generally follow the existing alignment except at the oxbow which would be left in place to function as a low flow channel. The creek would be 44 to 60 feet wide at the top of the bank, except between the State Street and Cabrillo Boulevard Bridges where it would be 60 to 70 feet wide. The average depth of the creek would be between 8 and 12 feet. Culverts would be installed in an open space, near the Moreton Bay Fig Tree, between Gutierrez and Yanonali Streets. Installation of culverts outside of the creek bed is called "With Oxbow Bypass" (see Figure 3.5.2). Five bridges along the study reach would be replaced, including the Ortega Street, Cota Street, De la Vina Street, Chapala Street, and Mason Street Bridges. The project features for this alternative are similar to Alternative 12, except the sideslopes would be stabilized by vertical concrete walls instead of combination of short-vertical walls and vegetated riprap. Habitat expansion zones are part of this alternative design. This alternative would result in significant impacts on aesthetics and recreational

resources. This alternative would not provide environmental benefits which would be provided by Alternatives 12 and 6. Please refer to Alternative 12 for detailed project description.

3.6 COMPARATIVE IMPACTS OF ALTERNATIVES:

Table 3.6-1 provides a summary of impacts and mitigation measures by alternative.

TABLE - 3.6-1

LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Brief Description of Alternatives:

Alternative No. 1:	No Action
Alternative No. 12:	3400 CFS Capacity with Oxbow Bypass; Stabilized sides using predominantly combination of vertical wall and riprap.
Alternative No. 6:	3400 CFS Capacity Without Oxbow Bypass - Stabilized sides using predominantly vegetated stepped walls with vertical walls applied for the remaining reaches.
Alternative No. 8:	3400 CFS Capacity with Oxbow Bypass - Stabilized sides using vertical walls.

Numbering of Alternatives is kept the same as Main Report for consistency and comparison purposes. Alternatives are also not in a sequential order because at AFB conference, decision was made that Alternative No. 12 is the NED and tentatively Recommended Plan. Therefore, detailed project description is developed for Alternative # 12 and placed prior to the other evaluated alternatives.

TABLE 3.6-1 (CONTINUED)
LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. No-1 No Action	Alt. No-12	Alt. No-6	Alt.-No-8	Mitigation	Comments/ Recommendations
Geology	No Significant Impacts	No Significant long term or short term impacts	Same as Alt. No. 12	Same as Alt. No. 12	No Mitigation required; construction and future maintenance will follow geotech survey recommendations.	
Water Quality		Minor short-term increase in turbidity levels during construction and future maintenance.	Same as Alt. No. 12	Same as Alt. No. 12	- Stream water diversion shall use pipes/ pilot channel and other standard methods to create low flow diversion channel during construction and future sediment removal. - No construction or sediment removal shall occur in flowing water or during heavy rains. Construction and future maintenance shall not occur during months of mid-December through March, when flow is high in the creek. - Conditions identified in the EIS/EIR shall be followed during construction as well as for future maintenance. - No discharge/leaks or spills of fuels, solvents or lubricants in the creek bed. A Storm Water Pollution Prevention Plan (SWPP) shall be required prior to project construction and implemented. **Cost:** 402 - Storm Water Pollution Prevention Plan; $500 fees (local sponsor). The construction contractor will prepare SWPP. 1603- Streambed Alteration Agreement (Fish and Game) – Fees of about $500 to 700, paid by the local sponsor. Chemical analysis cost about $10,000	Chemical Analysis of the excavated material is required prior to disposal. To reduce costs, Corps staff should collect the samples. Permits: 404 Corps permit - 404(b)(1) will be prepared for construction, will submit application. 401-WQC- Corps will request certification for both construction and future maintenance. 402- SWPP-NOI will be submitted by Corps. 1603-California Fish and Game – County will submit an application.

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. No-1 No Action	Alt. No-12	Alt. No-6	Alt.-No-8	Mitigation	Comments/ Recommendations
Ground Water	No change to existing conditions	In existing condition, hard bottom exists at certain locations within the channel. With the project, the entire project reach would be natural bottom channel which will result in minor increase in ground water recharge.	Same as Alt. No. 12	Same as Alt. No. 12	No mitigation required.	
Air Quality	No Impacts/ No change to existing conditions	During construction and future sediment removal, short term increase in fugitive dust; no long term impacts on air quality.	Same as Alt. No. 12	Same as Alt. No. 12	Water the excavation site, storage piles and unpaved roads twice each day of construction; once in the morning and at the end of the construction day; cover material transported in haul trucks; these conditions are applicable for construction and future maintenance. Limit vehicle speeds to 15 mph maximum within the construction site and maintenance areas (construction and future maintenance). Cease grading and earth movement when wind speeds exceed 20 mph, or as confirmed by SBCAPCD during construction and future maintenance activities.	

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA (SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. No-1 No Action	Alt. No-12	Alt. No-6	Alt.-No-8	Mitigation	Comments/ Recommendations
Noise	No Impacts/ No change to existing conditions	Short term increase in noise levels due to use of construction equipment and truck traffic. Noise levels will exceed 65 dBA at sensitive receptors. Residents located in the vicinity of the project area will experience increased noise levels during construction as well as during future maintenance.	Same as Alt. No. 12	Same as Alt. No. 12	Construction and future maintenance: Follow noise ordinance of the City of Santa Barbara. The project area is located within densely populated area; therefore, no loading or unloading of equipment or material shall be performed between 7:00 p.m. and 7:00 a.m., nor shall there be any heavy equipment operation prior to 8:00 a.m. and after 7:00 p.m. Monday through Saturday. No Sunday or holiday operation. Truck traffic shall be on designated truck routes established in coordination with the City of Santa Barbara. **Coordinate with city for local noise ordinance.**	The selected contractor shall coordinate with the City of Santa Barbara during project construction. The selected contractor shall ensure that noise ordinance set by the city of Santa Barbara would be followed.

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. Nº 1 No Action	Alt. Nº 12	Alt. Nº 6	Alt. Nº 8	Mitigation	Comments/Recommendations
Biological Resources	Impacts related to biological resources have been depicted by type of the species/vegetation					
Endangered Species	No Significant impacts	Incidental impact to steelhead and tidewater gobies could occur, but would be of temporary and insignificant level. Environmental commitments and mitigation measures form essential parts of the proposed plan.	Same as Alt. No. 12	Same as Alt. No. 12	No construction or maintenance within flowing water between December 1 and March 31 to avoid impacts to steelhead. Qualified biologist shall survey the area prior to the construction for presence of steelhead. Tidewater gobies shall be excluded from half the estuary at a time, and fish moved to the wet half while construction zone is dewatered slowly. Structural features along toe walls will improve habitat for both endangered species.	Temporary impacts to both species from construction minimized with appropriate environmental commitments. Mitigation features more than offset impacts Area of estuary habitat will more than double, increasing foraging areas for gobies.
Aquatic habitat	Approximately 0.4 habitat units removed by periodic channel maintenance	Net increase of habitat quality equivalent to about 0.4 habitat units when compared to Alternative 1.	Net impact to habitat quality equivalent to about 0.5 habitat units in comparison to Alt. 1	Same as Alt. No. 6	Strategic placement of large rocks as energy dissipaters; soft bottom throughout flood control project. Additional structural features along toe walls will enhance quality of aquatic habitat. Maintenance procedures will minimize effects on aquatic habitat.	Expenses for present channel maintenance have been $12,500 a year since 1995.
Isolated Native Trees	No significant impacts	12 to 15 trees will be removed. Western sycamores at two locations would be among them.	Same as Alt. 12	Same as Alt. 12	At least 210 trees established in 30 years. Alt. 12 - annual maintenance of trees planted in small parks, 5 years. *Note: Cost of lost Isolated Native Trees is included in mitigation of Stream Bank Vegetation.*	Small parks created from properties razed to accommodate conveyance designs with Alt. 12.

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. Nº 1 No Action	Alt. Nº 12	Alt. Nº 6	Alt. Nº 8	Mitigation	Comments/Recommendations
Biological Resources Continued	Impacts related to biological resources have been depicted by type of the species /vegetation.					
Stream Bank Vegetation	Projected average environmental quality equivalent to 0.48 habitat units.	Projected average environmental quality equivalent to 0.82 habitat units. Stream bank habitat would increase by 0.34 habitat units compared to Alternative 1.	Design features yield 0.52 habitat units. Negligible gain in stream bank habitat quality compared to Alternative 1.	All stream bank vegetation removed without design feature to replace it. Net impact equivalent to 0.48 habitat units.	**Alt. Nº 1**: long-term costs by private property owners for bank stabilization cannot be estimated realistically. **Alt. Nº 12**: Planting native trees and shrubs on sloped banks; habitat expansion zones in five locations; **Alt. Nº 6:** planting native shrubs on narrow, stepped-wall planters. **All build alternatives:** removal of giant reed and other exotic invasive plants within project area;	**Alt. Nº 1**: Scattered and irregular loss of existing bank vegetation as private revetment become more widespread. **Alt. Nº 12:** Trees will establish riparian canopy in 30 years, and shrubby vegetation will create under story of riparian community **Alt. Nº 6:** Native shrubby trees and other native plants planted in the space available between stepped walls. **Alt. Nº 8**: No opportunity to replace existing vegetation lost during construction with any appreciable plantings, native or otherwise.

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. No-1 No Action	Alt. No-12	Alt. No-6	Alt.-No-8	Mitigation	Comments/ Recommendations
Land Use	Within the project reach, no open space or agricultural lands exist in right-of-way, no impacts to existing land use.	(1) No impacts to agricultural lands, Long-term Permanent Impacts: Buildings or property located within the project right-of-way will be removed or demolished for project construction. Therefore, land use would change from residential to natural creek bed or open space. However, most of the buildings located within the project reach are very old and all property located within the flood plains is subject to severe flood damage during heavy rains or flooding. Land use will change from residential to natural creek bed or open space within the construction right-of-way. (2) This alternative would require demolition of 14 complete and 2 partial structures (includes 1 complete removal of commercial building; 4 single family residential units and 5 multiple family units; 1 patio deck and 1 garage). 1 commercial building would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing. No impact to oxbow area. Culverts would be installed away from the creek. During construction, temporary impacts near fig tree.	(1) Same as Alt. # 12 (2) This alternative would require demolition of about 15 complete and 2 partial structures (includes 1 complete removal of commercial building; 4 single family residential units and 5 multiple family units; 1 patio deck and 3 garages). Two commercial buildings would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing.	(1) Same as Alt. No. 12 (2) This alternative would require demolition of about 12 complete and 2 partial structures (includes complete removal of 1 commercial building; 3 single family residential units and 4 multiple family units; 1 patio deck and 1 garage). 1 commercial building would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing. Impacts related to installation of culverts are similar to Alternative 12.	The local sponsor will purchase the property and provide compensation to the property owner and tenants and/or property will be relocated. See Biological Resources for mitigation of construction impacts on Fig Tree. Some minor realignment of the channel and the use of short stretches of full vertical walls, as proposed would result in by the City and County, would result in protecting 5 residential buildings.	Costs of removal of the buildings are included in real estate acquisition

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	**Alt. No-1** **No Action**	**Alt. No-12**	**Alt. No-6**	**Alt.-No-8**	**Mitigation**	Comments/ Recommendations
Socio- economics	Property located along the creek bank would experience economic damage during each severe flooding season. Some commercial establishments would lose business.	(1) Long Term Impacts: Some of the property located along the creek bank would be removed. There would be economic loss to the property owner. However, property located within the flood plain would be protected from flooding hazards in future. Demolition of structures/ buildings: Refer to Land Use Section. Relocation of existing tenants may be difficult due to the cost of housing. (2) Alternative 12 would require removal of 14 full structures and 2 partial. See details on type of the structures in Land Use Section.	(1) Same as Alt. No. 12. (2) This alternative would require demolition of about 15 complete and 2 partial structures (includes complete removal of 1 commercial building; 4 single family residential units and 5 multiple family units; 1 patio deck and 3 garages). Two commercial buildings would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing.	(1) Same as Alt. No. 12 (2) (2) This alternative would require demolition of about 12 complete and 2 partial structures (includes complete removal of 1 commercial building; 3 single family residential units and 4 multiple family units; 1 patio deck and 1 garage). 1 commercial building would be removed partially. Relocation of existing tenants may be difficult due to the cost of housing.	The local sponsor would purchase the property or relocate the housing or commercial units to a safer zone. The property owner would receive compensation equal or more to their property value; therefore, project related impact is not significant. All property removal would be fully mitigated. **Costs:** Costs included in real-estate acquisition.	

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. No-1 No Action	Alt. No-12	Alt. No-6	Alt.-No-8	Mitigation	Comments/ Recommendations
Aesthetics	No Change in existing visuals	(1) Short-term: During construction, equipment and stockpile material would degrade aesthetic value of the project area. However, this impact is short term and would not be significant. (2) Long Term: Aesthetics/visuals of the creek banks would be improved with stabilization of banks. Implementation of this alternative will provide maximum aesthetic value. Creek will be more natural looking. Provides maximum vegetation cover. Bottom of the creek can not be seen from top because riprap will be planted with native and riparian vegetation. Aesthetic treatment would be provided to the vertical walls. (3) For safety reasons, some type of fencing shall be installed along the banks. If chain-link type of fencing is used, aesthetic treatment would be needed, including planting of vines to reduce impacts.	(1) Short-term impact would be same as Alternative 12. (2) Long-term: Compared to existing conditions, the creek course would be wider. More vegetation could be planted on stepped walls. This alternative would have a more pleasing visual appearance compared to existing conditions. Aesthetic treatment would be provided to the vertical walls. Project construction would be performed along oxbow; therefore, meandering course of the creek would be slightly altered. (3) Fencing impacts would be same as alternative No. 12.	(1) Short-term impacts would be same as Alternative No. 12 (2) Long-term: The current creek bank protection consists of various types ranging from vertical walls to gabions, sand bags etc. Compared to the existing banks, conditions would be improved; however, the creek banks would not have a natural look. With vertical walls, the creek aesthetics would be altered like a man made concrete channel. To minimize impacts, aesthetic treatments would be applied to the vertical walls. Project would pass through oxbow; therefore, meandering course of the creek would be slightly altered. (3) Fencing installation impacts would be same as Alternative No. 12.	**Alt. No. 12**: Upper banks will be planted with the natural vegetation. Create pocket parks. To enhance environmental value, construction of wetland near oxbow area would be performed. **Vertical Walls**: Plant vines along the vertical walls to minimize impacts; cover concrete with natural color and texture, subject to input by ABR, HLC and PC. If fencing is installed in the project design for safety purposes, plant vines along fencing to minimize impacts. Upgraded fence materials shall be used in areas visible or accessible to the public. **Alt. No. 6**: Stepped Walls: Appropriate aesthetic treatment would be incorporated in the project plan to minimize project related impacts. Stepped walls would be vegetated to enhance the visual value of the creek. Mitigation measures for vertical walls and fencing would be the same as Alt. No. 12. **Alt. No. 8**: Mitigation measures identified in Alt. No 12 to minimize impacts related to the vertical walls and fencing would be applicable to this alternative.	Type of wall treatments or selection of vines need to be coordinated with the City and County of Santa Barbara.and biologists.

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	**Alt. No-1** **No Action**	**Alt. No-12**	**Alt. No-6**	**Alt.-No-8**	**Mitigation**	Comments/ Recommendation
Recreation	No change in existing conditions. Area residents would continue informal use of creek as recreational corridor by walking or play-ing in creek.	Short-term: During construction, stock piled material, equipment etc. will restrict recreational use of the creek. However, all sections would not be constructed at the same time; therefore, this impact is temporary and not significant. Long-term impacts: This alternative provides maximum recreational opportunity compared to other alternatives. These opportunities includes: bird watching, walking along the creek bank, enjoying natural vegetation planted on upper slope of the creek. However, access to the creek bottom will be restricted and the creek's limited use as a connective corridor may be lost.	Short-term impacts would be same as Alt. No. 12. Long-term Impacts: Partially vegetated walls will provide bird watching and walking type of activities. Like Alt. 12 public would not have access to the creek bottom; therefore, creek's use as a connective corridor may be lost.	Short-term: Same as Alt. 12. Long-term: It would reduce opportunity for bird-watching because this alternative provides less opportunity for vegetation planting. Access to the creek bottom will be restricted and the creek's use as a connective corridor will be lost.	Alt. 12: Planting of native and riparian type of vegetation along the upper slope of the creek banks and within open areas. Create pocket parks and construction of wetland at oxbow. Viewing areas trash cans and setting at bridges, as approved by the City. Alt. 6: Planting of natural riparian vegetation along stepped-walls, which would allow increased opportunity for bird watching. Provide maximum access to the residents for recreation use. Small parks shall be created from properties razed to accommodate conveyance designs. Alt. 6 impacts would remain significant and unavoidable. Cost: Planting of native and riparian vegetation is included in the biological resource. Construction of creation of pocket parks and wetland is also included in biological resources. Approximately 3% of the project cost is allocated for aesthetic treatment, including treatment to vertical wall surface treatment and improved fencing. City will pay for bridge replacement and enhancements.	

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. No-1 No Action	Alt. No-12	Alt. No-6	Alt.-No-8	Mitigation	Comments/ Recommendations
HTRW 1	No Impacts. The two HTRW sites in the project area would continue to be contaminated until such time as clean-up is completed.	Two HTRW sites are located within the project reach, at 324 De la Vina and 220 W. Gutierrez Streets. The De la Vina property was used by former dry-cleaning establishment. Testing of sediments would be required at West Gutierrez Street. Sediment contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants; possibility of encountering PCE contaminated soil and/or shallow groundwater in the vicinity of the West Gutierrez Street Bridge. This event could potentially cause releases of this substance to the environment; and, possibility of encountering deep sediment contaminated by HTRW.	Same as Alt. 12	Same as Alt. 12	Equipment shall be in proper condition; no gasoline or oil change shalld occur in the creek bed. Prior to construction, samples of creek sediments will be analyzed to determine contamination. Plan will be developed in coordination with the regulatory agencies (RWQCB, County Department of Environmental Health Services). If sufficient information is available, a work plan shail be developed to determine characterization of the plume and impact to the shallow groundwater and sediment.	The RWQCB Region is aware of this problem and is working on resolution of this issue. This issue is not resolved yet. Currently, the property is owned by Cal-trans. Attorney representing property owner at 220 West Gutierrez Street is reportedly attempting to involve Caltrans in sharing the cost of remediation of the PCE plume. If the issue is not resolved, the construction at this location may be delayed.

Hazardous Toxic and Radioactive Wast (HTRW)

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	**Alt. No-1 No Action**	**Alt. No-12**	**Alt. No-6**	**Alt.-No-8**	**Mitigation**	Comments/ Recommendations
Traffic	No Impact	Short-term/Long-term: During project construction and future sediment removal, some residents may not have direct access to their residences. Street closure would be required in some locations. This impact is a short-term, temporary increase in truck traffic along selected haul routes. Particular concerns would arise during the replacement of the De la Vina/ Haley Street bridge which would impact a major commuter route on Haley Street.	Same as Alt. 12	Same as Alt. 12	Project construction would be performed by sections. No access to the residents or commercial establishment would be eliminated. Appropriate detours and traffic control officers would be provided to direct traffic. Alternative routes shall be coordinated with the City of Santa Barbara. Cost is dependent upon number of traffic control staff needed. If city or county provide manpower, than there should be no costs. At each construction site (sector), a minimum of two traffic inspectors would be required.	

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. No-1 No Action	Alt. No-12	Alt. No-6	Alt.-No-8	Mitigation	Comments/ Recommendations
Safety	The City of Santa Barbara would have continuing threat of flooding.	Short-term Impacts: During construction, truck traffic will increase, potentially causing accidents. Long-term Impacts: After completion of the project, it could be possible that people could enter the creek bed and injured. In addition, people may get into by-pass tunnel and criminals may live and hide in culvert.	Same as Alt. 12	Same as Alt. 12	Short-term Impacts: During construction, traffic control officers would be provided to divert traffic to minimize accidents. Long-term Impacts: Fencing or other type of the protection shall be provided for public safety. Access points shall be provided to facilitate safe rescue. Install bars at end of tunnel to restrict passage to people (applicable to oxbow bypass Alts) Costs: Fencing costs would be included in project design. Traffic control officers would be provided to divert traffic to minimize accidents	Project would provide flood control protection to property located within the flood plain and safety to the residents living along the creek bank.

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA (SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. No-1 No Action	Alt. No-12	Alt. No-6	Alt.-No-8	Mitigation	Comments/ Recommendations
Cultural Resources	No Impacts	No historic structures will be impacted under NEPA: Additional structures impacted under CEQA: A. 15 W. Mason St. - Proposed for removal. B. Potter Hotel Footbridge - Proposed for removal. C. 134 Chapala St. - Proposed for partial removal. D. 434 De la Vina St. - Proposed for removal. E. 306 W. Ortega St. - Proposed for removal. F. 536 Bath St. - Proposed for removal. G. 116 Chapala St. Proposed for removal H. West Downtown Neighborhood - Loss of buildings that contribute to potential status. I. Waterfront Neighborhood - Loss of structures that contribute to potential status.	Same as Alt 12, w/o buildings 7-9.	Same as Alt. 6	No mitigation measures are required under NEPA. Mitigation Under CEQA: 1. Extend box culvert downstream of Chapala Street Bridge. 2. Same as #1. Depending on design, may not mitigate to less than significant. A. HABS recordation. Significant unavoidable impact. B. See #1. HAER recordation & relocation would result in significant unavoidable impacts. Preservation in place would fully mitigate impacts. C. HABS recordation, photographic study & short history. D. Same as C. E. Begin vertical wall further upstream or otherwise redesign to avoid house. Also acceptable, HABS recordation & relocation on-site F. Realign proposed channel or relocate house on-site. G. Relocate on-site. If not feasible, relocate off-site & complete biography of Karl Obert. Relocation off-site results in significant unavoidable impacts. Further review shows this structure will not be impacted. H. & I. Save buildings on-site. Complete survey to determine boundaries and contributing elements. Also, conserve any sandstone removed throughout project reach. Sandstone may be used to provide caps or for other project-related purposes. Any remaining stone shall be held by the City for use in other City projects.. In the event of a project redesign, the USACOE will pay the mitigation costs for the structure s and buildings that are eligible for the National Register. Costs of structures eligible for State or Local Register will be paid by the City or Local Sponsor.	If the Sandstone Diversion, or the Chapala St. Bridge are affected as a result of final design, mitigation may also include reuse of sandstone blocks from the retaining wall. They could be used in other locations or to rebuild the new expanded channel. Every attempt will be made to reuse structural elements from dismantled historic properties to adhere as closely as possible to the City's General Mitigation measures will be specified in an MOA.

TABLE 3.6-1 (CONTINUED) - LOWER MISSION CREEK FLOOD CONTROL PROJECT-SANTA BARBARA, CALIFORNIA
(SUMMARY OF IMPACTS, MITIGATION BY ALTERNATIVES ANALYZED FOR ENVIRONMENTAL EVALUATION)

Resource	Alt. No-1 No Action	Alt. No-12	Alt. No-6	Alt.-No-8	Mitigation	Comments/ Recommendations
Utilities	No Impacts	Water, sewer and telephone lines are located within the project reach. Relocation of these utility lines would be required. Residents may experience temporary loss of services for short periods.	Same as Alt. 12	Same as Alt. 12	Relocation of utility lines would be performed in such a manner as to minimize disruption in service and accidental spills. If there is disruption, property owners and tenants will be notified in advance.	

SECTION - 4 - PLANS AND POLICIES

This Section discusses the project's consistency or inconsistency with City and State plans and policies. This analysis was also used to assist in the preparation of the Coastal Consistency Determination required by the federal Coastal Zone Management Act (See Section 11, Land Use).

The following narrative provides a summary discussion and evaluation of the relevant plans and policies that guide development in the project area. Goals and Policies are presented in italics and are followed by a determination of the project's potential consistency with the quoted goal or policy. A final determination of consistency will be made by the Santa Barbara City Council; therefore, the reader is cautioned that the discussion is intended to serve only as a preliminary interpretation of consistency or inconsistency.

4.1 LOCAL PLANS AND POLICIES:

The following narrative provides a discussion of relevant City plans and policies that guide land use, creek protection, flood control and circulation that might affect this project.

4.1.1 Santa Barbara City Charter:

The City of Santa Barbara is a Charter City which means that, instead of following all of the general rules established by the State for cities, the City has elected to establish its own set of rules to the degree allowed by State law. The Charter was established by a public vote. Amendments to the Charter are also subject to approval by a vote of the citizens of Santa Barbara. A brief discussion of the pertinent Charter Sections follows.

4.1.1.1 Charter Section 1507

On November 2, 1982, voters in the City of Santa Barbara approved Measure K which later became Section 1507 of the City Charter. This section states:

> *"It is hereby declared to be the policy of the City that its land development shall not exceed its public services and physical and natural resources. These include, but are not limited to, water, air quality, wastewater treatment capacity,*

and traffic and transportation capacity. All land use policies shall provide for a level and balance of residential and commercial development which will effectively utilize, but will not exhaust, the City's resources in the foreseeable future. In making land use decisions, the City shall be guided by the policies set forth in this section. In furtherance of these policies, no amendments to the City's General Plan and Zoning Ordinance shall be effective unless approved by five (5) affirmative votes of the City Council. Upon such approval, General Plan and Zoning Ordinance amendments shall be conclusively presumed to comply with the policies set forth herein."

This project is potentially consistent with Charter Section 1507 because it does not result in a significant impact on City resources.

4.1.1.2 **Charter Section 1508**

This Charter Section was approved by the voters as Measure E on November 7, 1989, and amended in November 1996. The Section limits the amount of nonresidential square footage that can be constructed in the City until January 1, 2010. Because this project does not involve any increase in habitable non-residential square footage, it is potentially consistent with Charter Section 1508. If any non-residential square footage (i.e., 15 West Mason Street) is demolished as a result of this project, it can be reused on-site of adequate area is available or transferred to another site as Government Displacement square footage.

4.1.2 **Santa Barbara Municipal Code**

The Santa Barbara Municipal Code comprises all of the local laws that the City of Santa Barbara has adopted to regulate activities within its boundaries. Only two areas of the Municipal Code have direct application to the Lower Mission Creek Flood Control Project. Chapter 22.24, Flood Plain Management, applies to all areas in the City designated as Special Flood Hazard Areas and any new structures proposed in those areas. Although the Lower Mission Creek Flood Control Project is within the hazard area, it is not considered to be a structure as defined in this Chapter. A structure is defined as "a walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home." The flood control project is not walled and roofed.

Section 28.87.250, Development Along Creeks, applies specifically to Mission Creek.

This section requires that all new development be set back a minimum of 25 feet from the top of the bank of the creek. Subsection 28.87.250.1 states as follows:

> *The purpose of this Section is to provide controls on development adjacent to the bed of Mission Creek within the City of Santa Barbara. These controls are necessary:*
>
> *a. to prevent undue damage or destruction of developments by flood waters;*
>
> *b. to prevent development on one parcel from causing undue detrimental impact on adjacent or downstream properties in the event of flood waters;*
>
> *c. to protect the public health, safety and welfare.*

No development is allowed within the setback area unless it is found to be consistent with the above-stated purposes. This project will result in a reduction in damage or destruction by flood waters, will reduce the potential for development on one parcel to cause undue detrimental impact on adjacent or downstream properties, and it will improve protection of the public health, safety and welfare. On that basis, the project is determined to be potentially consistent with this ordinance section. There will be existing buildings that are within 25 feet of the new top of bank for the widened creek. There are presently 51 structures within 25 feet of the existing top of bank in the project reach. When the project is completed, there will be 50 structures within 25 feet, of the top of the widened creek, a reduction of one (1) structure. Because the project will result in a reduction in the number of buildings within 25 feet of the creek bank, it is considered to be potentially consistent with this provision.

4.2 SANTA BARBARA GENERAL PLAN:

The City's adopted General Plan is required by State law and contains a number of Elements that specify policies which relate to the proposed project. A brief discussion of applicable policies is provided below.

The reader should be aware of the fact that the Local Coastal Plan supercedes and refines the General Plan for those areas of the City which lie within the Coastal Zone. Where elements of the General Plan do not specifically refer to this type of project, the reader should consider the

language of the Local Coastal Plan as providing additional specificity and policy direction. See Section 4.3 for further discussion of Local Coastal Plan goals and policies.

4.2.1 **Land Use Element:**

The Land Use Element defines the existing and future layout of development in the City. There are two sections of the Land Use Element: the Land Use (or General Plan) Map and the text. The Map shows Land Use Designations for the City; the text discusses what these designations mean in more detail and often includes discussion of differences in emphasis for areas with the same designation in different areas of the City.

The land use designations are discussed in Section 11.1.4. The project is potentially consistent with the Land Use Map designation because it will still be a creek. However, please see discussions below for further consideration of what different General Plan Elements require for creeks in the City.

In terms of the Land Use Element text, Principle #8 states that:

> *"It is essential to protect the historic, architectural, and natural qualities of Santa Barbara's environment and to preserve the ecological balance of all life systems with which we coexist."*

Alternative 12, as mitigated, would be potentially consistent with most of this principle because it would restore and enhance the natural qualities of Mission Creek. In addition, the bridge designs would be consistent with Architectural Board of Review and Historic Landmarks Commission Design Guidelines, there would be habitat restoration included as part of the project and the creek alignment would be adjusted to protect most historic buildings and structures. It should be noted that one (1) City Structure of Merit at 15 West Mason Street, a portion of 134 Chapala Street, which is eligible for designation as a Structure of Merit and 434 De la Vina Street, which is also eligible for Structure of Merit designation, would be removed under all three construction alternatives under consideration. However, the City of Santa Barbara Historic Landmarks Commission agrees with the findings of the Architectural Survey (*Post/Hazeltine, 1999*). The findings indicate that, in order to protect these particular buildings it would be necessary to remove other, more significant, structures. Because Alternative 12, as originally designed, would have significant unavoidable impacts on the Chapala Street Bridge and the Potter Hotel Footbridge, it would be potentially inconsistent with this principle. However, if, as

proposed to mitigate impacts on historic resources, the box culvert were extended below the Chapala Street Bridge and both the bridge and the footbridge remain *in situ*, the project would also be potentially consistent with the historic portion of this principle.

Alternatives 6 and 8 would be potentially inconsistent with this principle because lost habitat would be inadequately replaced and up to 15 historic structures would be removed without the required consideration for either realigning the creek or relocating the structures.

Alternative 6 would be the least consistent with this principle because it would not protect the Mission Creek Diversion.

Goal #5 is to:

> *"Maintain the unique desirability of Santa Barbara as a place to live, work and visit."*

Alternative 12 would include requirements for aesthetic treatment of the creek banks, would improve the appearance of the creek in areas visible to the public (as well as in other areas) and would return the creek to a more natural appearance. Thus, Alternative 12 would be potentially consistent with this goal.

Channelizing Mission Creek under Alternatives 6 and 8, especially in areas where it is visible to the public (local or visitor), would be potentially inconsistent with this goal unless a solution to their visual and aesthetic impacts can be devised.

4.2.2 **Noise Element:**

The Noise Element focuses on the noise environment in the City. It points out problem areas and sets goals for maintaining and enhancing good noise conditions and improving areas with noise problems. The goal of the Noise Element is *"to ensure that the City of Santa Barbara is free from excessive noise and abusive sounds."* The maximum exterior noise levels allowed by the Noise Element are based on the sensitivity of different uses. The maximum exterior noise level allowed for residential use is 60 dB(A) CNEL. The maximum exterior noise level allowed for hotel and motel use is 70 dB(A) CNEL and the maximum allowed for most other commercial uses is 75 dB(A) CNEL. Existing ambient noise levels in the project area range from less than 60 dB(A) CNEL to 70 dB(A) CNEL. During construction of the channel, construction-related noise would range from 80 to 89dB(A). However, construction would be likely to affect a particular area of the project for only a few days at a time as construction moves down the creek. The Noise Element focuses primarily on long term noise concerns. However, Policy 6.0 of the Noise Element points out that "*noise control activities should be coordinated with those of other responsible jurisdictions.*" This encourages the City, the District and the Corps to coordinate in reducing noise impacts during construction of the channel. The mitigation measures proposed to reduce construction noise would minimize the potential noise impacts of the construction project and call for coordination of construction with requirements in the City's Noise Ordinance. Thus, construction noise, as mitigated, would be potentially consistent with the Noise Element. Once channelization is completed, the noise levels will return to their ambient conditions; therefore, the project would be potentially consistent with the Noise Element in the long term.

4.2.3 **Conservation Element:**

Policies related to water, air, cultural, biological and visual resources are incorporated into the Conservation Element. Those goals and policies that relate to this project are considered and discussed below. The Conservation Element specifically states that consistency is based on Goals and Policies, not on the Implementation Strategies. The Implementation Strategies have been incorporated for information purposes only.

4.2.3.1 **Cultural and Historic Resources**

Cultural and Historical Resources Goal

Sites of significant archaeological, historic, or architectural resources will be preserved and protected wherever feasible in order that historic and prehistoric resources will be preserved.

Cultural and Historic Resources Policies

1.0 Activities and development which could damage or destroy archaeological, historic, or architectural resources are to be avoided.

As outlined in the Cultural Resources discussion in this document (Section 18), the various project alternatives would result in impacts on archaeological sites which can be mitigated to an acceptable level. For archaeological resources, the project is potentially consistent with this policy.

There are several historic buildings that are in the project's Area of Potential Effect, as outlined in Chapter 18. These include the following resources, eligible for the National Register of Historic Places, the California Register of Historic Resources and/or City of Santa Barbara Landmark or Structure of Merit:

15 West Mason Street
20 West Mason Street
101 State Street (floor only)
116 Chapala Street
118 Chapala Street
120 Chapala Street
134 Chapala Street
Chapala Street Bridge
Potter Hotel Footbridge
Mission Creek Diversion
Moreton Bay Fig Tree
434 De la Vina Street

536 Bath Street
308 West Ortega Street

Of the above historic resources, 15 West Mason Street and 434 De la Vina Street cannot be avoided by the project design and would be removed. It is also likely that a portion of 134 Chapala Street would be removed. In the case of the buildings at 434 De la Vina Street and 134 Chapala Street, the impacts of their loss would be mitigated through substantial recordation requirements. The structure at 15 West Mason Street poses a different issue. The Post/Hazeltine Associates (PHA) report prepared on these architectural resources states:

> *"demolition of 15 West Mason Street will allow for an alternative realignment of Mission Creek that would preserve the integrity of the 100 block of Chapala Street and the house at 20 West Mason Street. Preservation of these other resources preserve(s) a more significant part of Santa Barbara's architectural and historical integrity."*

Project changes that would protect 15 West Mason Street would likely result in the loss of 116, 118 and 120 Chapala Street and 20 West Mason Street. The effects on the other historic resources can be mitigated by project redesign, including minor changes in alignment and extension of the box culvert downstream of the Chapala Street Bridge. Given the impacts that would occur if 15 West Mason Street were protected and the importance of the structures on Chapala Street and at 20 West Mason Street, Alternative 12 would be potentially consistent with this policy.

Alternative 8 is very similar to Alternative 12 in its effect on historic resources. Assuming that the same mitigation measures were imposed, it would be potentially consistent with this policy.

Finally, the Moreton Bay Fig Tree, at the corner of Montecito and Chapala Streets, is a designated City Landmark and is also recognized as one of the largest trees of its type in North America. The Biological Resources Section concludes that there will be no impacts on the Tree as a result of construction of any of the project alternatives.

4.2.3.2 **Visual Resources**

Visual Resources Goals

Restore where feasible, maintain, enhance and manage the creekside environments within the City as visual amenities, where consistent with sound flood control management and soil conservation techniques.

Protect and enhance the scenic character of the City.

Maintain the scenic character of the City by preventing unnecessary removal of significant trees and encouraging cultivation of new trees.

Protect significant open space areas from the type of development which would degrade the City's visual resources.

Visual Resources Policies and Implementation Strategies

1.0 Development adjacent to creeks shall not degrade the creeks or their riparian environments.

1.1 Setbacks, as required by the Federal Flood Insurance Program, should be enforced (see Drainage and Flooding section).

1.2 Examine undeveloped parcels having creek frontage for possible purchase and retention as open space.

1.3 Developments which require retaining walls or other topographic modifications of the creekside environment should not be permitted unless consistent with sound flood control management and soil conservation techniques.

1.4 Develop a creek beautification ordinance.

4.0 Trees enhance the general appearance of the City's landscape and should be preserved and protected.

4.1 Mature trees should be integrated into project design rather than removed. The Tree Ordinance should be reviewed to ensure adequate provision for review of protection measures proposed for the preservation of trees in the project design.

4.2 All feasible options should be exhausted prior to the removal of trees.

4.3 Major trees removed as a result of development or other property improvement shall be replaced by specimen trees on a minimum one-for-one basis.

5.0 Significant open space areas should be protected to preserve the City's visual resources from degradation.

5.1 The City should consider purchase or the obtainment of development rights of significant open space where no other means can be found to protect visual resources from degradation.

The loss of skyline trees that would result from construction of any of the alternatives is potentially inconsistent with Visual Resources Policy 4.0 until such time as the replacement trees have grown enough to create a new skyline. However, if Alternative 12 were redesigned to save as many of the mature trees as feasible, especially native trees and skyline trees, whether native or non-native, Alternative 12 could be considered potentially consistent with Visual Resources Policy 4.0 in the long-term.

Alternative 12, which includes the greatest opportunity for habitat restoration incorporates establishment of native vegetation on the creek banks as well as on the slopes of those banks. Most of the vertical walls included in the design are short, would be colored and textured and would be hidden most of the time by overhanging vegetation planted on the slopes above. Full height vertical walls have been minimized. In addition, Alternative 12 would include habitat expansion zones that would serve the multiple purpose of providing additional habitat, improving visual quality and providing for open space for use by area residents. With the exception of concerns related to all project alternatives addressed below, Alternative 12 would be potentially consistent with these Visual Resources Goals and Policies.

Alternative 6 would be potentially inconsistent with these Visual Resources Goals and Policies because it would not maximize the potential to enhance the scenic character of the project area. The stepped walls would still appear, in many cases, to be a single vertical wall. Plant growth would be limited by the narrow planting areas between the upper and lower portions of the stepped walls. Lower Mission Creek is the only open space of any magnitude in

the West Downtown area; its loss without creation of pocket parks or other passive recreation would be potentially inconsistent with Visual Resources Policy 5.0.

Alternative 8, which would be designed entirely with vertical walls, would be potentially inconsistent with the Visual Resources Goals and Policies outlined above because such channelization would not look natural. In addition, it would not meet City goals to protect and enhance the natural environment. Santa Barbara's primary economic base is built on its visual appearance and beauty. A significant contribution to this appearance is the City's Waterfront. Mission Creek flows through this important area as well as along the edge of the Downtown area. If its appearance is not designed to be aesthetically pleasing, it would not enhance the scenic character of the City. Lower Mission Creek is the only open space of any magnitude in the West Downtown area; its loss without creation of pocket parks or other passive recreation would be potentially inconsistent with Visual Resources Policy 5.0.

A significant concern for all three project alternatives would be the type of fencing proposed along the creek banks. Chainlink fencing, which is typically used to keep people out of the creek, would be potentially inconsistent with the Visual Resources Goals and Policies. Where feasible, fencing should be eliminated and replaced with native plantings that would keep people out, such as wild rose and/or blackberries. In other locations, the use of decorative fencing or fencing that fades from view would be appropriate. If these mitigation measures are included in the project design, Alternative 12 would be potentially consistent with these Visual Resources Goals and Policies.

This project is not directly related to Visual Resources Policy 1.0 because the project involves the creek itself rather than development adjacent to the creek. However, the City of Santa Barbara will need to review adjacent development against this policy. It may also be necessary to reconsider the purpose of the 25-foot setback from the creek as required by the City Zoning Ordinance. The focus of this setback is presently based on flood protection only. The focus should be expanded to include habitat protection and buffer considerations. The City is pursuing Creek Strategic Planning for all City creeks, including Mission Creek. Part of this planning process will include reevaluation of existing creek policies and ordinance provisions.

4.2.3.3 **Air Quality**

Air Quality Goal

- *Maintain air quality above Federal and State ambient air quality standards.*

The proposed project alternatives are potentially consistent with this Air Quality goal because its implementation would not contribute to noncompliance with Federal and State air quality noncompliance for the short- or long-term.

4.2.3.4 **Biological Resources**

Biological Resources Goal

Enhance and preserve the City's critical ecological resources in order to provide a high quality environment necessary to sustain the City's ecosystem.

Biological Resources Policies and Implementation Strategies

1.0 A set of land-use suitability guidelines shall be developed for use in land planning and the environmental review process.

1.3 Where not preempted by the Federal Flood Insurance Program, land-use regulations will be developed for the creek influence zones of Mission, Sycamore, San Roque, and Arroyo Burro Creeks.

a. Assign the task of conducting a biological study of the creek influence zones to the Community Development Department. This study is to determine the general land uses within the zone which would be compatible with the maintenance of the existing biologic communities of the creeks, and is not intended to consider the development of public recreation facilities within the creeks.
b. Enact a flood control and creek ordinance which would include provisions to restrict channelization in natural creek bottoms and structural developments within the 100-year floodplain in natural creek areas.

c. Conduct a feasibility study on the replacement of concrete bottoms of channelized creek sections with natural bottoms and/or the use of mitigation measures to increase the diversity of channelized creeks.

4.0 The habitats of rare and endangered species shall be preserved.

6.0 Intertidal and marine resources shall be maintained or enhanced.

10.0 Programs shall be developed to maintain a productive urban biotic community.

Two of the three project alternatives would result in some net improvement to biological resources. All project alternatives would include removal of existing concrete bottom in the project reach. All three Alternatives would either be neutral or improve habitat for threatened and endangered species that occur within the project area. Alternative 8 would result in a reduction of biological resources and would, therefore, be potentially inconsistent with these policies.

Alternative 12 would include the greatest habitat improvements, resulting in an increase in habitat units. The reason for Alternative 12's greater habitat value is that there would be more complete stream bank habitat that could be established on the sloped rip-rap and also because of the creation of new habitat in five locations along the project reach.. Additional measures to protect the Tidewater goby and Steelhead trout would further improve habitat values. Alternative 12 would be potentially consistent with the Conservation Element Biological Resources goals and policies.

Even with Alternative 12, however, there would be some concern that there would be an inadequate buffer for habitat purposes at the top of the bank. Although Biological Resources Implementation Strategy 1.3a calls for the establishment of appropriate uses within the creek influence zone necessary to protect biological resources, the only protection in the area is a 25 foot wide buffer established primarily for flood control purposes. See additional discussion of this issue under the Local Coastal Plan.

Alternative 6 may also be potentially consistent with these Biological Resource policies because there is a net increase in habitat units. However, that increase is not as great as with

Alternative 12. Alternative 8 results in a net loss of habitat; therefore, it is potentially inconsistent with these policies.

4.2.3.5 **Drainage and Flood Control**

Drainage and Flood Control Goals

Insure that human habitation of the City's floodplains does not adversely affect public health, safety, and welfare.

Encourage recreation, conservation and open space uses in floodplains.

Provide Federal Flood Insurance for structures already in flood hazard zones.

Drainage and Flood Control Policies and Implementation Strategies

1.0 The City shall participate in the Federal Flood Insurance Program so that property owners may receive disaster assistance.

2.0 Floodplain management programs shall be implemented through the Building Officer of the Division of Land Use Controls, and the Flood Control Division [of the Public Works Department].

3.0 Hazard reduction programs shall be implemented in urban sections of the City already built in hazardous flood-prone areas.

4.0 Goals and policies of this element are interrelated with those of the Safety and Open Space Elements and shall be considered together in land use planning decisions.

4.1 Encourage the use of natural building materials for flood control channels such as stone, heavy timber, erosion control, shrubs, and wire revetment with plantings of native or naturalized flora wherever they provide a comparable degree of flood protection.

4.2 Creeks and their banks constitute a scenic open space resource within the City in their natural state; thus, the Open Space Element also recognizes the importance of keeping structures out of the stream channels

for preservation of City resources.

4.3 The Safety Element recognizes the hazard to lives and property of encroachment of structures into stream channels and on stream banks; thus, it also supports the findings of this Element on the basis of hazard reduction.

Alternative 12 would use a more natural approach to its design, which would allow native vegetation within the creek banks while providing improved flood protection. Therefore, Alternative 12 would be potentially consistent with these goals and policies. It should be noted that, through the Division of Land Use Controls and the County Flood Control District, the City has implemented those goals and policies which require participation in the Federal Flood Insurance Program.

Project Alternatives 6 and 8 would be potentially inconsistent with these Drainage and Flood Control goals and policies because the channelization of lower Mission Creek would result in the loss of opportunity for recreation, conservation and open space uses in the flood plain.

4.2.3.6 **Water Resources**

Water Resources Goal

To maintain existing and protect future potential water resources of the City of Santa Barbara.

Water Resources Policy

3.0 Implement monitoring program of groundwater resources in the Santa Barbara basin.

With the use of a natural bottom, all project alternatives would be potentially consistent with this goal and policy because there would be no adverse effects on groundwater recharge.

4.2.4 **Parks and Recreation Element:**

The Parks and Recreation Element focuses on the provision of adequate park space and recreation facilities for residents of and visitors to the City. The Parks and Recreation includes a discussion of the placement of neighborhood parks along major drainage channels:

> *Many of the existing Neighborhood Parks are along major drainage channels. Every opportunity to utilize these wooded drainage channels for park purposes should be taken. In the Wilson area, for example, such a location represents the best available opportunity for the provision of park facilities.*
>
> *In the medium- and high-density residential areas, the Neighborhood Park facilities should be supplemented by small, passive landscaped parks oriented to the older citizen. These can be quite small, providing no more than benches in addition to the landscaping. De La Guerra Plaza is a good example of this level of facility.*

The five to six habitat expansion areas proposed as part of the project provide an opportunity to create passive park spaces in one or more of the areas. The best opportunities would occur at the corner of Bath and Ortega Streets and on De la Vina Street, south of Gutierrez Street. At a minimum, interpretive signing, benches and trash cans would be provided. Pathways may also be appropriate. It may also be possible, as a separate project, to acquire additional property to create a tot lot. This project is potentially consistent with this discussion.

Regarding the Moreton Bay Fig Tree at Chapala and Montecito Streets, the Parks and Recreation Element refers to this area as a Special Use Area and states:

> *"The Moreton Bay Fig Tree is a major landmark in the City. The park area surrounding this unique specimen should ultimately be expanded to provide an appropriate setting and protection. The General Plan proposes that the crosstown freeway design provide an appropriate setting and protection. The General Plan proposes that the crosstown freeway provide for grade separations at State Street, but not at Chapala Street. It is recommended that Chapala Street be terminated at points above the freeway and below the railroad tracks so that*
>
> *additional land can be devoted to the park area around the Moreton Bay Fig Tree."*

It has been determined in the Biological Resources Impact section that those alternatives

that include the oxbow bypass culvert would not impact the Fig Tree. In addition, the proposed channelization would not impact the ability of the City to terminate Chapala Street and create additional park area around the Fig Tree and would thus be potentially consistent with the discussion.

Finally, the Parks and Recreation Element includes a discussion of riding and hiking trails:

> *The primary objective of a trail system should be the provision of trails leading from the residential areas of town up to the foothills and down to the beaches. The major drainage channels shown on the General Plan provide the best locations to accomplish this. Those shown are Arroyo Burro Creek, Mission Creek, Sycamore Creek, and Cold Springs Creek. Efforts should be made to set these natural areas aside not only for the trails and the important recreational activity which they provide, but also for the preservation of the natural open space as a diversified factor in the urban scene. The modern techniques of channeling these drainage areas into a uniform and sterile concrete trough should be avoided. This intensity of urbanization is not characteristic of [the] Santa Barbara environment.*

While the Parks and Recreation Element encourages the inclusion of riding and hiking trails along the major creeks, it does not require such trails. The City of Santa Barbara intends to continue exploration of appropriate opportunities to create trails in the future, especially in the Waterfront area and in the more natural part of the creek, above Outer State Street. The design of the proposed project avoids the appearance of "a uniform and sterile concrete trough." While the present creek has little natural open space to preserve, this project will provide for enhancement of the creek through the provision of a buffer of native trees and plants consistent with the riparian environment. See the Conservation Element Visual Resources Policies for additional discussion. The project is potentially consistent with this discussion.

4.2.5 **Open Space Element:**

The primary purpose and goal of the Open Space Element are:

> *"To protect the character of Santa Barbara . . . by conserving and providing significant open and natural landforms through and around the community."*

"There are many overlaps between open space and other community features which share the goal of conserving the Santa Barbara character. The protection of mature trees on private property, the landscaping of major developments, the policies on architectural sign control, and many other subjects in the General Plan serve a function parallel with that of open space. Only those segments of open space meeting the criteria of Citywide significance are discussed here."

The Open Space Element discusses Creek issues as follows:

"The major drainage channels which passes through the City are San Roque, Arroyo Burro, Mission Canyon [sic], and Sycamore Creeks. These drainage channels should remain in their natural state, providing recreation facilities as proposed in the Parks and Recreation section as well as open space corridors through the community. It is recognized that certain maintenance, clearing, and alignment work may have to be done in order to minimize flood damage. However, all such flood control work should be done in a manner that will maintain the natural qualities of the creek open space. Further artificial channelization and/or lining, in any form, must not occur."

"Implementation of the creek open space category involves the City's establishment of firm policies to preserve these channels in their natural state. These policies must be enforced by the City, the County Flood Control District, and the Army Corps of Engineers. The acquisition of rights-of-way for trails, while important to the recreation system, is not essential to the protection of these corridors for open space purposes. Special regulations for development adjacent to the major creeks should be enacted to prevent construction in creek open space areas and to protect development from known flood hazards. While much of the land adjacent to these creeks is already developed, most will be redeveloped. New construction should respect the creeks as important community open space."

The loss of skyline trees that would result from construction of any of the alternatives would be potentially inconsistent with discussion until such time as the replacement trees have grown enough to create a new skyline. Another significant concern for all project alternatives would be the type of fencing proposed along the creek banks. Chainlink fencing, which is typically used to keep people out of the creek would be potentially inconsistent with the Open

Space Element and its emphasis on a natural appearance. Where feasible, fencing should be eliminated and replaced with native plantings that would keep people out, such as wild rose and/or blackberries. In other locations, the use of decorative fencing or fencing that fades from view would be appropriate.

Alternative 12, which would include the greatest opportunity for habitat restoration, would incorporate establishment of native vegetation on the creek banks as well as on the slopes of those banks. Most of the vertical walls included in the design would be short, would be colored and textured and would be hidden most of the time by overhanging vegetation planted on the slopes above. In addition, Alternative 12 would include habitat expansion zones which would serve the multiple purpose of providing additional habitat, improving visual quality and providing for open space for use by area residents. Alternative 12 would be potentially consistent with goals of the Open Space Element.

Alternative 6 would be potentially inconsistent with the Open Space Element because it would not maximize the potential to enhance the scenic character of the project area. The stepped walls would still appear, in many cases, to be a single vertical wall. Plant growth would be limited by the narrow planting areas between the upper and lower portions of the stepped walls. Lower Mission Creek is the only open space of any magnitude in the West Downtown area; its loss without creation of pocket parks or other passive recreation would be potentially inconsistent with the Open Space Element.

Alternative 8, which is designed entirely with vertical walls, would be potentially inconsistent with the Open Space Element discussion outlined above because such channelization would not look natural. In addition, this alternative would not meet City goals to protect and enhance the natural environment. Finally, lower Mission Creek is the only open space of any magnitude in the West Downtown area; its degradation would be potentially inconsistent with the Open Space Element.

4.2.6 **Seismic Safety and Safety Element:**

The Seismic Safety and Safety Element is focused on analyzing existing geologic, flood, earthquake related, fire and other life-threatening considerations and developing means of avoiding or preparing for disasters related to these concerns.

Seismic Safety and Safety Goals:

To protect life, property and public well being from seismic and other geologic hazards.

To reduce or avoid adverse economic, social, and environmental impacts caused by geologic conditions.

Ground Shaking Policy

4. Require the design and construction of utility systems, and other facilities which need to remain operable after an earthquake, to be able to resist ground shaking forces.

Liquefaction Policy

1. Liquefaction evaluations and recommendations should be made by a qualified soils engineer for all new major or public structures located in high or conditional liquefaction areas (shown on the Liquefaction Hazard Map) whose failure could result in loss of life or high monetary loss.

Erosion Policy

2. Major construction projects in areas of active or high erosion potential shall be required to implement erosion and sediment control procedures during the construction phase of the project.

All of the project alternatives would be required to complete pre-construction geotechnical studies to assure that they would be able to withstand ground shaking and liquefaction hazards. In addition, any of the wall types proposed would result in improvements to the erosion potential along the creek banks. Therefore, all three project alternatives would be potentially consistent with these policies.

Flooding Policies

1. Establish and enforce adequate creek setbacks or buffer zones to protect new development from flood and erosion hazards.

2. Conduct "precise-alignment" studies along Mission and Arroyo Burro Creeks to determine the most efficient stream channel configuration and setback distances. Any improvements resulting from the studies should be reviewed as to consistency with the Conservation Element.

3. To assure the effectiveness and structural integrity of flood containment structures placed on private land, all such construction shall be subject to the approval of the Santa Barbara Flood County Control District.

4. Encourage light intensity use in the floodway or floodway fringe with the requirement that such uses shall not impair the flood-carrying capacity of the stream.

The City has established setbacks along Mission Creek which require that new development be placed a minimum of twenty-five feet away from creek banks; however, much of the property along Mission Creek was developed long before the setbacks were established. In addition, within the flood zones, the City requires that new development be constructed such that finished floor elevations are above projected flood levels. All new construction is also subject to review and approval by the Santa Barbara County Flood Control District. In developing the design for flood control on Mission Creek, "precise-alignment" studies have been completed by the Army Corps of Engineers. The project design has taken these studies into account. Therefore, all three project alternatives would be potentially consistent with these policies. However, please review the Conservation Element policies for further discussion.

4.2.7 **Circulation Element:**

The Circulation Element is focused on providing for adequate transportation facilities for the amount of traffic (motorized vehicle, pedestrian, aircraft, bicycle, etc.) existing and projected in the City. The following Goals, Policies and Implementation Strategies have some relationship to this project:

Goal 5 Increase Walking and Other Paths of Travel

Develop a comprehensive system of pedestrian routes which are integrated with other modes of transportation and which provide safe and efficient paths of travel.

Policies and Implementation Strategies

5.1 The City shall create an integrated pedestrian system within and between City neighborhoods, schools, recreational areas, commercial areas and places of interest.

5.1.1 Identify and link major activity centers and destinations with walkways. This will consist of the following:

surveying existing connections between neighborhoods and identifying opportunities and constraints for new pedestrian connections,

identifying existing barriers to walking to school and where feasible eliminating those barriers,

providing improved access for pedestrians (for example, between such areas as the Eastside, Westside, Mesa, Lower State, Upper State and Waterfront areas, major attractions, recreation, cultural, and commercial areas), ...

5.3 Protect and expand existing paseos and acquire new paseos in the Downtown.

5.3.1 Develop conceptual designs and guidelines for new paseos.
5.3.2 Establish protective mechanisms such as land acquisitions, historic designations, use of easements, private development cooperation, and development controls for the paseo system.
5.3.3 Encourage private development to incorporate public paseos by offering increased density and other incentives for providing or improving paseos and paseo connections.
5.3.4 Consider closing streets to create pedestrian plazas if, upon consultation with a broad segment of the community and general agreement of the affected business owners and property owners, it can be demonstrated that it would improve pedestrian access and enhance the Downtown business environment.

5.5 The City shall create and foster a pedestrian friendly environment through physical and cultural improvements and amenities.

5.5.1 Provide street furniture, especially benches for resting and shade trees along streets, where appropriate. Look for opportunities for new resting spots, plazas, placitas, small squares, and landscaped areas in all areas of the City which should include focal point(s), opportunities for people watching, and/or attractive natural surroundings. These areas will encourage gathering, public

and social interaction and could be used for cultural events and activities. An example could be the placement of benches and street furniture in Chase Palm Park.

5.5.2 Identify areas where additional street and paseo lighting is appropriate and implement methods to provide that lighting.

5.5.6 Look for opportunities to connect placitas to public, private and institutional uses. Include signage, as appropriate.

Goal 9 Develop Special Policies Related to Transportation and Parking in the Coastal Zone

Create a more consolidated parking system in the waterfront area and explore new and/or expanded opportunities for use of alternative transportation. In order to open up new areas for recreational use and to allow for better views from Cabrillo Boulevard, no further development of parking should occur on the ocean side of Cabrillo Boulevard, except in the developed harbor areas if consistent with the Harbor Master Plan.

9.1 The City shall encourage use of alternative modes of transportation, especially non-motorized options, in and around the Coastal Zone.

9.1.1 Improve pedestrian, bicycle, and transit access throughout the Coastal Zone. Improve access from the Wharf and Harbor areas to the La Playa (City College) lots, Waterfront, and State Street areas through such methods as:

- *providing additional bicycle and pedestrian paths,*
- *working with transit providers to increase transit service,*
- *improving the existing beachway to increase safety for pedestrians, cyclists, skaters, and other forms of non-motorized travel,*
- *providing additional bicycle racks and/or lockers in public areas, including public parking lots,*
- *improving lighting along pedestrian routes to encourage pedestrian activity especially between Lower State Street, Stearns Wharf, the Harbor and the overnight tourist accommodations, and*
- *providing additional seating and resting spots in public areas for pedestrians.*

9.1.3 Develop a paseo plan for the interior portions of the HRC-2 zone, especially along Helena and Anacapa Streets between Cabrillo Boulevard, and

Yanonali and State Streets to improve pedestrian circulation in the Waterfront area and attract visitors to the interior areas. See Chapter 5 for a description of paseos. Utilize dedication and develop paseos with landscaping and pedestrian amenities.

All of the project alternatives have an opportunity to improve pedestrian access to Mission Creek. However, for the most part, these opportunities have not been taken. With the Circulation Element's emphasis on enhancing pedestrian opportunities in the various neighborhoods, all project alternatives are potentially inconsistent with the Circulation Element Goals and Policies outlined above. However, Alternative 12 includes habitat expansion areas, some of which have the potential for passive park space. Provision of pocket parks where parcel remnants are left and creation of attractive bridges, including seating areas, would encourage walking throughout the project area. In addition, the creation of a pedestrian walkway or paseo along the easterly bank of the creek between State Street and Yanonali Street would provide a new route between the Waterfront and the park that is being completed as part of the Railroad Depot restoration project. This would create an opportunity to bring residents and tourists to the rear of properties along the creek, opening the potential for restaurants and other activities overlooking Mission Creek. Alternative 12 is the only alternative that allows for consideration of park spaces or walkways.

4.2.8 **Housing Element:**

The Housing Element is focused on the maintenance and provision of adequate housing for residents of and workers in the City, especially for moderate and low income residents.

Housing Element Policy

3.5 The City shall ensure that public projects requiring relocation plans under State or Federal relocation laws shall be coordinated and reviewed by the City. Affordable, decent, safe, and sanitary housing shall be available to those displaced within the City or within the South Coast area. Fair compensation and relocation assistance shall be available to those displaced.

All project alternatives, except the no Action Alternative, would require the demolition and/or relocation of existing housing units along lower Mission Creek. The City will be responsible for relocating displaced residents in accordance with local, State and Federal laws.

The City will assure that fair compensation and relocation assistance will be available to those displaced by this project. Therefore, the project would be potentially consistent with this policy.

4.3 LOCAL COASTAL PLAN:

The Local Coastal Plan (LCP) applies to the coastal areas of the City. It is required by the California Coastal Act of 1976 and is based on the Coastal Initiative of 1972. Its primary purposes are to protect coastal resources, assure that coastal-dependent uses have a high priority in the coastal area and protect access to the California Coast by residents of and visitors to California.

Three general policies guide the LCP, as follows:

1.1 The City adopts the policies of the Coastal Act (Public Resources Code Sections 30210 through 30263) as the guiding policies of the land use plan.

1.2 Where policies within the land use plan overlap, the policy which is the most protective of resources, i.e. land, water, air, etc., shall take precedence.

1.3 Where there are conflicts between the policies set forth in the land use plan and those set forth in any other element of the City's existing General Plan or existing regulations, the policies of the land use plan take precedence.

A discussion of the policies of the California Coastal Act follows this discussion of the City LCP. Please review the policy areas outlined below for discussion of potential consistency or inconsistency.

4.3.1 Water and Marine Environments:

The following policies in the Water and Marine Environments Section of the LCP apply to this project:

6.1 The City through ordinance, resolutions, and development controls shall protect, preserve, and where feasible restore the biotic communities designated in the City's Conservation Element of the General Plan and any future annexations to the City, consistent with PRC Section 30240.

6.6 Revetments, seawalls, bulkheads, groins, pipelines, outfalls and other necessary permitted construction shall be designed to eliminate or mitigate to the maximum extent adverse impacts on local shoreline sand supply.

6.8 The riparian resources, biological productivity, and water quality of the City's coastal zone creeks shall be maintained, preserved, enhanced, and where feasible, restored.

6.9 The City shall support the programs, plans, and policies of all governmental agencies, including those of the Regional Water Quality Control Board with respect to best management practices for Santa Barbara's watersheds and urban areas.

Regarding Policies 6.1 and 6.8, the biotic communities discussed in the Conservation Element include riparian, wetland and estuarine habitats. All of these habitats would be affected by the proposed project. Two of the three project alternatives would result in some net improvement to biological resources. All project alternatives would include removal of existing concrete bottom in the project reach. All three Alternatives would either be neutral or improve habitat for threatened and endangered species that occur within the project area. Alternative 8 would result in a reduction of biological resources and would, therefore, be potentially inconsistent with these policies. Additional measures to protect the Tidewater goby and Steelhead trout would further improve habitat values. Alternative 12 would be potentially consistent with Policies 6.1 and 6.8.

Even with Alternative 12, however, there is some concern that there may be an inadequate buffer for habitat purposes at the top of the bank. Although Biological Resources Implementation Strategy 1.3.a calls for the establishment of appropriate uses within the creek influence zone necessary to protect biological resources, the only protection in the area is a 25-foot wide buffer for flood control purposes. However, the City of Santa Barbara has proposed establishing a non-profit nursery that would be used for restoration and mitigation programs along creeks. It would also be used to provide residents who live along the creeks with native trees and shrubs that would allow the expansion of the riparian buffer into private back yards.

All of the project alternatives would end at the upstream side of Cabrillo Boulevard bridge. The amount of silt, sand and other materials carried by Mission Creek would not

decrease. The project would not result in adverse impacts on the sand supply. Therefore, all three project alternatives would be potentially consistent with Policy 6.6.

The project would be required to meet all regulations of all governmental agencies, including the Regional Water Quality Control Board, regarding water quality. All three project alternatives would, therefore, be potentially consistent with Policy 6.9.

> *6.11 Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (1) Necessary water supply projects, (2) Flood control projects where no other method for protecting existing structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) Developments where the primary function is the improvement of fish and wildlife habitat.*

This project would constitute a substantial alteration of Mission Creek, as outlined in Policy 6.11 above. This policy echoes California Coastal Act Policy 30236, as well. As a flood control project, it is one of the three types of projects allowed by the two policies. Two questions related to this policy would then remain: 1) Does any project alternative "incorporate the best mitigation measures feasible?" and 2) Is "no other method for protecting existing structures in the flood plain" feasible and is it necessary for public safety or to protect existing development?

The second question is the easier of the two to answer. At the beginning of the Feasibility Study, the history of flooding on Mission Creek is outlined in some detail. It is clear from this review that some type of flood control project is necessary to promote public safety and protect existing development. In reviewing the alternatives considered, but not included in the EIS/R, it is also clear that other approaches to reducing flooding impacts were considered and found to be infeasible.

Alternative 12 (the Preferred Alternative) is projected to cost approximately $18 million (this includes revisions to reflect the gross appraisal of acquisition costs prepared for the City and changes to the project design to reduce land acquisition costs). An alternative that consists of a short vertical wall and vegetated riprap slope at 1.5:1 (H:V) above would require an additional 20 feet of width (10 feet on each side) to construct. An alternative that consists solely of vegetated riprap slope at 1.5:1 would require an additional 26 feet of width (13 feet on each side). Because

of the location of the existing structures in this area, it would be necessary to remove several structures or portions of such structures. Property acquisition and remodel of the remaining buildings alone is estimated to cost an additional $4 million. This assumes that instead of full take of the buildings involved, it would be possible to remove a portion of the building and remodel the remainder rather than completely demolish the structure. If it is infeasible to remodel the structure(s), costs could be even higher. In any case, because the benefit from the Corps standpoint would be substantially unchanged, but the costs would substantially increase, it would not be possible to meet the required cost:benefit standard. Therefore, a project alternative that includes riprap side slope for all or part of the length south of the freeway is infeasible.

In terms of adequate mitigation, Alternatives 6 and 8 probably would not adequately mitigate environmental impacts (in that they are not "the best mitigation measures") nor would they mitigate the effects on other coastal resources. Thus, Alternatives 6 and 8 would be potentially inconsistent with these policies. It appears that Alternative 12 would come closest to meeting this test. There would be substantial replacement of lost habitat and, in fact, restoration of habitat that once existed along Mission Creek, but has not been present for some time. There are additional improvements that could be made to the design to further reduce impacts, including wall designs that are more natural appearing and creating a pedestrian walk along the easterly bank of the creek between State and Yanonali Streets to connect the shoreline to the railroad depot area. With the inclusion of these measures, Alternative 12 would be potentially consistent with these policies.

4.3.2 **Visual Quality:**

The following policy in the Visual Quality Section of the LCP applies to the proposed project:

> *9.1 The existing views to, from, and along the ocean and scenic coastal areas shall be protected, preserved, and enhanced.*

The loss of skyline trees that would result from construction of any of the alternatives is potentially inconsistent with this Visual Quality Policy until such time as the replacement trees have grown enough to create a new skyline.

Alternative 12, which includes the greatest opportunity for habitat restoration incorporates establishment of native vegetation on the creek banks as well as on the slopes of

those banks. Most of the vertical walls included in the design are short, would be colored and textured and would be hidden most of the time by overhanging vegetation planted on the slopes above. Full height vertical walls have been minimized. In addition, Alternative 12 would include habitat expansion zones which would serve the multiple purpose of providing additional habitat, improving visual quality and providing for open space for use by area residents. With the exception of concerns related to all project alternatives addressed below, Alternative 12 would be potentially consistent with this Visual Quality policy.

Alternative 6 would be potentially inconsistent with this Visual Quality policy because it would not maximize the potential to enhance the scenic character of the project area. The stepped walls would still appear, in many cases, to be a single vertical wall. Plant growth would be limited by the narrow planting areas between the upper and lower portions of the stepped walls. Lower Mission Creek is the only open space of any magnitude in the West Downtown area; its loss without creation of pocket parks or other passive recreation would be potentially inconsistent with this Visual Quality policy.

Alternative 8, which would be designed entirely with vertical walls, would be potentially inconsistent with this Visual Quality policy because such channelization would not look natural. In addition, it would not meet City goals to protect and enhance the natural environment. Santa Barbara's primary economic base is built on its visual appearance and beauty. A significant contribution to this appearance is the City's Waterfront. Mission Creek flows through this important area as well as along the edge of the Downtown area. If its appearance is not designed to be aesthetically pleasing, it would not enhance the scenic character of the City. Lower Mission Creek is the only open space of any magnitude in the West Downtown area; its loss without creation of pocket parks or other passive recreation would be potentially inconsistent with this Visual Quality policy.

A significant concern for all three project alternatives would be the type of fencing proposed along the creek banks. Chainlink fencing, which is typically used to keep people out of the creek, would be potentially inconsistent with this Visual Quality policy. Where feasible, fencing should be eliminated and replaced with native plantings that would keep people out, such as wild rose and/or blackberries. In other locations, the use of decorative fencing or fencing that fades from view would be appropriate. If these mitigation measures are included in the project design, Alternative 12 would be potentially consistent with this Visual Quality policy.

4.3.3 **Land Use:**

The following policy in the Land Use Section of the LCP applies to the proposed project:

12.2 New developments within the City's Waterfront Area shall be evaluated as to a project's impact upon the area's:

(1) Openness;
(2) Lack of Congestion;
(3) Naturalness; and
(4) Rhythm.

The LCP defines each of the above terms and how they should be considered in reviewing projects. "Openness" refers to minimizing visual impacts in terms of building density, scale, mass and height. It also is concerned with protecting access to the Waterfront Area by balancing the distribution of coastal resources and urban facilities so that the existing degree of openness is maintained. This project's visual impacts would not relate to building density, mass, scale or height in the Waterfront Area nor would the project result in a loss of a general sense of openness (see discussion of "Naturalness").

"Lack of Congestion" refers to protecting and maintaining Cabrillo Boulevard as a scenic drive by minimizing vehicle access onto the boulevard and focusing pedestrian activities to the south of the boulevard. It also emphasizes maintenance of the uncongested quality of the Waterfront Area by requiring that parking be located north of Cabrillo Boulevard. The proposed project would not result in effects on congestion in the area. In fact, if Alternative 12 includes a creek walk between State and Yanonali Streets, it may reduce congestion on both State Street and Cabrillo Boulevard and enhance the experience for residents and visitors alike.

"Naturalness" refers to protection of views to the foothills, mountains and ocean within the existing view corridors along Cabrillo Boulevard keeping in mind motorists and other users of Cabrillo Boulevard, Palm Park users and users of adjacent beach areas and other public facilities (such as the bikeway). In addition, protection of view corridors from excessive building height or mass, intense architectural programming, facade treatment or other activities which detract from the natural dominance of these views is required. Alternative 8, which includes only vertical walls in the lower part of the creek, would have an adverse effect on the "naturalness" of the setting. The vertical walls would distract people from more distant views

because of their strong effect on near views. Rather than a somewhat natural creek appearance, tall concrete walls would be the main feature which would deflect people away from the distant views. Alternatives 6 and 12, which are all sloped or which vary in their treatment of the creek back, but include substantial establishment of native vegetation would contribute to naturalness. The type of fencing involved with any of the alternatives would also have an impact on these views.

Finally, "Rhythm" refers to "protecting, maintaining, and enhancing rhythm and patterns of the waterfront." The LCP indicates that the art show reflects the application of this principle and states that access to the beach and other activities in the area should proceed on this principle by meeting increased user demand with shuttle buses and other forms of mass transit rather than through the addition of new parking facilities in the Waterfront. The project's effect on rhythm would be similar to that of 'lack of congestion. Again, if a creek walk is included with one of the alternatives, it could enhance rhythm in this area.

Overall, Alternatives 6 and 8 would be potentially inconsistent with Policy 12.2, primarily in the areas of lack of congestion, naturalness and rhythm. Alternative 12 may be potentially consistent with this policy, especially if it is possible to create a pedestrian walk between State Street and the railroad station.

4.4. CALIFORNIA COASTAL ACT POLICIES:

The California Coastal Act was adopted in 1976 and is based on the California Coastal Initiative of 1972, overwhelmingly approved by the voters in order to recognize the importance of and to protect the California coastline. As noted above, its primary purposes are to protect coastal resources, assure that coastal-dependent uses have a high priority in the coastal area and protect access to the California Coast by residents of and visitors to California. The Coastal Act is part of the State Public Resources Code (PRC). The policies that apply to this project are discussed below.

4.4.1 **Public Access:**

The following Coastal Act policy on public access applies to this project:

PRC Section 30211 - Public Access

Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

Because the proposed project area would end at the upstream end of the Cabrillo Boulevard Bridge and would, therefore, result in no changes to the beach area, it would be potentially consistent with this policy.

4.4.2 **Recreation:**

The following Coastal Act policy on recreation applies to this project:

PRC Section 30221 - Recreation

Oceanfront land suitable for recreational use shall be protected for recreational use and development unless present and foreseeable future demand for public or commercial recreational activities that could be accommodated on the property is already adequately provided for in the area.

This project would not affect oceanfront land used for recreation because it would end above Cabrillo Boulevard; therefore, the project would be potentially consistent with this policy.

4.4.3 **Marine Environment:**

The following Coastal Act policies on marine environment apply to this project:

PRC Section 30230 - Marine Environment

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Two of the three project construction alternatives would result in some net improvement to biological resources. All project construction alternatives would include removal of existing concrete bottom in the project reach. These Alternatives would either be neutral or improve habitat for threatened and endangered species that occur within the project area. Alternative 8 would result in a net loss of habitat value.

Alternative 12 would include the greatest habitat improvements, resulting in a 3:1 replacement of habitat units. The reason for Alternative 12's greater habitat value is because there would be more complete stream bank habitat that could be established on the sloped rip-rap and also because of the creation of new habitat in five locations along the project reach. Even with Alternative 12, however, there is some concern that there may be an inadequate buffer for habitat purposes at the top of the bank. Alternative 12 has been further refined to include additional habitat enhancements that would protect or improve habitat for the Tidewater goby and the Steelhead trout, in consultation with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service.

All of the project construction alternatives would end at the upstream side of Cabrillo Boulevard bridge. The amount of silt, sand and other materials carried by Mission Creek would not decrease. The project would not result in adverse impacts on the sand supply. Therefore, the project would be potentially consistent with this policy.

PRC Section 30231 - Marine Environment

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

The proposed project would be potentially consistent with this policy in that it would be required to meet all water quality standards required by local, State and Federal regulations, especially those of the Regional Water Quality Control Board.

PRC Section 30232 - Marine Environment

Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.

The proposed project construction alternatives would be potentially consistent with this policy due to the existing regulations, requirements and procedures on reporting, containment and cleanup of accidental spills.

PRC Section 30233 - Marine Environment

(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to the following:

(1) New or expanded port, energy, and coastal-dependent industrial facilities, including commercial fishing facilities.

(2) Maintaining existing, or restoring previously dredged, depths in existing navigational channels, turning basins, vessel berthing and mooring areas, and boat launching ramps.

(3) In wetland areas only, entrance channels for new or expanded boating facilities; and in a degraded wetland, identified by the Department of Fish and Game pursuant to subdivision (b) of Section 30411, for boating facilities if, in conjunction with such boating facilities, a substantial portion of the degraded wetland is restored and maintained as a biologically productive wetland. The size of the wetland area used for boating facilities, including berthing space, turning basins, necessary navigation channels, and any necessary support services, shall not exceed 25 percent of the degraded wetland.

(4) In open coastal waters, other than wetlands, including streams, estuaries, and lakes, new or expanded boating facilities and the placement of structural pilings for public recreational piers that provide public access and recreational opportunities.

(5) Incidental public service purposes, including but not limited to, burying cables and pipes or inspection of piers and maintenance of existing intake and outfall lines.

(6) Mineral extraction, including sand for restoring beaches, except in environmentally sensitive areas.

(7) Restoration purposes.

(8) Nature study, aquaculture, or similar resource dependent activities.

(b) Dredging and spoils disposal shall be planned and carried out to avoid significant disruption to marine and wildlife habitats and water circulation.

Dredge spoils suitable for beach replenishment should be transported for such purposes to appropriate beaches or into suitable long shore current systems.

(c) In addition to the other provisions of this section, diking, filling, or dredging in existing estuaries and wetlands shall maintain or enhance the functional capacity of the wetland or estuary. Any alteration of coastal wetlands identified by the Department of Fish and Game, including, but not limited to, the 19 coastal wetlands identified in its report entitled, "Acquisition Priorities for the Coastal Wetlands of California", shall be limited to very minor incidental public facilities, restorative measures, nature study, commercial fishing activities in Bodega Bay, and development in already developed parts of south San Diego Bay, if otherwise in accordance with this division . . .

(d) Erosion control and flood control facilities constructed on water courses can impede the movement of sediment and nutrients which would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for such purposes are the method of placement, time of year of placement, and sensitivity of the placement area.

This policy prohibits the diking, filling or dredging of open estuaries and wetlands except under certain conditions and for certain types of projects. There is an existing estuary at the mouth of Mission Creek which runs upstream to a point just above the Mason Street bridge. The estuary would be neither diked or filled as part of this project. Therefore, the project would be potentially consistent with this policy.

PRC Section 30236 - Marine Environment

Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (1) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) developments where the primary function is the improvement of fish and wildlife habitat.

See discussion of Water and Marine Environment Policy 6.11 under the city's Local Coastal Plan.

4.4.4 **Land Resources:**

The following Coastal Act policy on land resources applies to this project:

PRC Section 30240 - Land Resources

(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only such uses dependent on such resources shall be allowed within such areas.

(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade such areas, and shall be compatible with the continuance of such habitat areas.

See discussion of Biological Resources impacts above.

PRC Section 30244 Land Resources

Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

See discussion under the City Conservation Element Cultural Resources policies.

4.4.5 **Development:**

The following Coastal Act policies on development apply to this project:

PRC Section 30251 - Development

The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character [of] surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.

There is some disagreement on the visual quality of lower Mission Creek as it exists, especially near the creek mouth. The area from just upstream of Mason Street to the ocean is a typical estuary area. Most of the year the creek mouth is plugged with sand, creating a back water area where fish grow, shorebirds loaf or feed and vegetation develops along the edges. By late summer, the estuary is often covered with algae and the oxygen level in the water is low. This can lead to a smell that is offensive to many people. In addition, the creek is often littered with paper and plastic wrappers and other debris, leading to a distasteful appearance in addition to its smell. When streamflow is adequate during the rainy season, the flow of water unplugs the mouth and cleans the estuary area. Many years, streamflow is inadequate to blow out the sand plug so the smell and appearance problems can carry over from year to year. However, this phenomenon is a natural one.

Overall, the alternatives 6 and 8 would be potentially inconsistent with this policy because of its impact on a scenic area. However, Alternative 12 would be potentially consistent with this policy, for the most part. See the Visual Quality policy discussion of the City's Local Coastal Plan discussed in Subsection 4.3.2 of this Section and the Conservation element policy discussion in Subsection 4.2.3.2.

PRC Section 30253 - Development

New development shall:

(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.

(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.

(3) Be consistent with requirements imposed by an air pollution control district or the State Air Resource Control Board as to each particular development.

(4) Minimize energy consumption and vehicle miles travelled.

(5) Where appropriate, protect special communities and neighborhoods which, because of their unique characteristics, are popular visitor destination points for recreational uses.

The proposed project construction alternatives would be potentially consistent with subsections (1), (2), (3) and (4) of this policy because they would minimize flood risks to life and property in this area, would not affect bluffs and cliffs and would not affect air quality or energy use in the long term. However, the Waterfront Area of the City is considered to be a special neighborhood that should be protected in terms of its ambience (See Section 4.3.3.3 of this Chapter for discussion of this area). The visual effects of Alternatives 6 and 8 would make it potentially inconsistent with part (5) of this policy. Alternative 12 would be consistent with this part of the policy, for the most part.

PRC Section 30254 - Development

New or expanded public works facilities shall be designed and limited to accommodate needs generated by development or uses permitted consistent with the provisions of this division; provided, however, that it is the intent of the Legislature that State Highway Route 1 in rural areas of the coastal zone remain a scenic two-lane road. Special districts shall not be formed or expanded except where assessment for, and provision of, the service would not induce new development inconsistent with this division. Where existing or planned public works facilities can accommodate only a limited amount of new development, services to coastal dependent land use, essential public services and basic industries vital to the economic health of the region, state, or nation, public recreation, commercial recreation, and visitor-serving land uses shall not be precluded by other development.

The proposed project would not have a direct impact on development in the affected area in terms of the amount of development allowed by the City's General and Local Coastal Plans. However, because of the avoided costs of flood insurance and special project design, more development may occur than would be the case without the project. Because such additional development would be required to be consistent with the LCP and, therefore, the Coastal Act, the proposed project would be potentially consistent with this policy.

SECTION- 5 - AFFECTED ENVIRONMENT AND IMPACT ANALYSIS

5.1 INTRODUCTION:

R The environmental effects of the proposed array of alternatives presented in the Main Feasibility Report and outlined in the EIS/EIR, the affected environment, and impact analysis by each resource are discussed in detail in chapters 6 through 19. Alternative 12 is the National Economic Development (NED) and tentatively recommended plan. Alternative 1, the No Action/No Project Alternative, represents the future without project condition. During plan formulation study, twelve alternatives were formulated to provide flood protection to the city of Santa Barbara. This Chapter summarizes the significant resources identified within the project area and which would be impacted by implementation of the recommended Alternative 12. Alternative 12 provides maximum opportunity for providing incidental environmental benefit by planting vegetation native to a riparian habitat, compared to all other viable alternatives. The EIS/EIR also includes impacts and mitigation measures related to activities.

Twelve structural Alternatives were evaluated during the Feasibility Study. After the Alternatives Formulation Briefing, based on the cost benefit ratio and incidental environmental benefits, a decision was made that Alternative 12 meets the required cost benefit ratio and provides the most incidental environmental benefits. The twelve alternatives were developed during the feasibility study. However, these alternatives were similar in nature; therefore, based on criteria, similarities and differences in the basic design features, the decision was made to evaluate four Alternatives for detailed environmental analysis in the EIS/EIR. They are Alternatives 1, 6, 8, and 12. Alternative 1 continues to be the No Action plan against which the consequences of structural solutions are evaluated. Details of these Alternatives are described in Section 3.5 of this document.

5.2 GENERAL EXISTING ENVIRONMENTAL CONDITIONS:

Field studies were accomplished in conjunction with this EIS/EIR within a study area (Figure 1.1.2) that extends from Carrillo Street downstream to the Pacific Ocean. (The study area encompasses all of the area potentially impacted by the Authorized Project, a more extensive area than that covered by the currently proposed alternatives.) A cultural resources survey was conducted and an Archaeological Survey Report for the Proposed Flood Control Channel Improvements Along Lower Mission Creek was prepared by a staff archaeologist, Mr. Richard Perry. This report is on file at the Corps Los Angeles District office. A Historic survey was prepared by Post/Hazeltine Associates. The Survey is summarized in the Cultural Resources Section. The survey is on file at the Corps Office and at the City of Santa Barbara

Planning Division. The report of surveys for biological resources within the project area was conducted by a staff biologist, Dr. John Moeur. The EIS/EIR summarizes the results of field studies conducted by the U. S. Army Corps of Engineers (USACOE). The loss of habitat due to project construction and the value of mitigation options were quantified by a modified Habitat Evaluation Procedures analysis. A study and survey of other resources/factors within the study area, including a preliminary assessment screening for the potential presence of hazardous and toxic waste materials, water quality, and chemical analysis of sediment within the study area, were conducted by KEA Environmental, Inc. Information on the City of Santa Barbara General Plan and Policies for all resources including land use data and analysis, and growth inducement was provided by the City of Santa Barbara. Details of the City of Santa Barbara's General Plan and Policies on Environmental Resources are included in Section 4. In addition, an evaluation of each resource in relation to the criteria set by the City of Santa Barbara is taken into consideration. The Corps of Engineers technical staff conducted and participated in field surveys, analysis, coordination, and mitigation planning. The Notice of Intent was prepared by the USACOE technical staff working together with technical staff of the City of Santa Barbara, who reviewed the reports and mitigation planning. The City of Santa Barbara prepared the requisite Notice of Preparation, and Initial Study (Appendix I). The City of Santa Barbara's technical staff, Ms. Janice M. Hubbell, AICP, Project Planner, provided evaluation of applicable regulations of the City of Santa Barbara General Plan and Local Coastal Plan for each resource. The technical staff ensured that the document is written in compliance with CEQA and applicable General Plan and Local Coastal Plan goals and policies are incorporated in the evaluation of each resource.

The EIS/EIR includes, as appropriate, consideration of impacts of both initial construction and future periodic debris removal; cumulative impacts of the proposed action on the environment when added to reasonably foreseeable future actions/projects in the area; a summary of mitigation measures and environmental commitments; the relationship between short-term uses of man's environment and maintenance and enhancement of long-term productivity; and any irreversible or irretrievable commitment of resources which would be involved in the proposal should it be implemented. Alternative 1, the No Action/No Project (future without project conditions) alternative, is discussed in Chapter 3 of the EIS/EIR. Impact analysis of Alternatives 12, 6, and 8 is discussed by factor or resource topic (see Chapters 6 to 19). Because none of the alternatives would have a detectable impact on local or regional climatic conditions, climate is discussed in this analysis only in the context of air quality impacts.

5.3 EXISTING SIGNIFICANT RESOURCES LOCATED WITHIN THE PROJECT AREA.

Evaluation of each environmental resource has been performed in this EIS/EIR. A survey of each resource was performed. After identification of each resource located within the project area, it was determined that the project area does contain two significant resources, biological and cultural. Therefore, only these two resources have been discussed briefly in the following paragraphs.

R **Biological Resources:**

Two species of fish, both listed for Federal protection as endangered under the Endangered Species Act, make use of Mission Creek. The tidewater goby (*Eucyclogobius newberryi*) enters the creek from the coastal lagoon and forages as far upstream as the Chapala Street Bridge. At that point, a man-made sill about 1½ feet high and spanning the entire channel probably blocks gobies from swimming into the lower end of the sandstone-walled channel in all but the high water events of the winter rainy season, a time of year when gobies would congregate much closer to salt water anyway. Tidewater gobies would be present in the area to be affected from late spring through the fall months. The second species, steelhead (*Oncorhynchus mykiss*), use the lower end of Mission Creek as a migratory channel when flow conditions permit. Adults could swim upstream after steady winter rains have raised runoff rates. The species evidently spawns successfully in some years in the upper reaches of the watershed. Juvenile steelhead would use Mission Creek through the project area only as a migratory corridor to the ocean. Lower Mission Creek, the area within the project area, does not afford rearing conditions or suitable spawning conditions for steelhead.

Isolated native trees of notable age still occur at various locations along the creek. Of these, six are western sycamores (*Platanus racemosa*) and one is a coast live oak (*Quercus agrifolia*). Elsewhere along the creek, a young cottonwood (*Populus fremontii*) struggles to survive against the effects of periodic channel maintenance, and a few mature willows (*Salix lasiolepis*) and fewer still white alders (*Alnus rhombifolia*) have become established on the overbank.

The large Moreton Bay Fig Tree (*Ficus macrophylla*), for which Santa Barbara is renowned, grows east of Mission Creek and at an elevation about 7 feet higher than the channel.

Cultural Resources:

As planned, the preferred alternative is unlikely to adversely affect any prehistoric cultural resources. However, due to the close proximity to the ethnohistoric Chumash village of syxutun, the potential exists for discovering unknown archeological deposits as a result of channel widening activities. The proposed alternative will impact 10 historic resources, none of which are eligible for inclusion in the National Register of Historic Places (NRHP). Some of the structures will need to be removed or partially removed to accommodate the widening of the channel. With the exception of the NRHP eligible Chapala Street Bridge, the other bridges in the APE are not eligible for NRHP listing.

In addition to the houses along the creek channel, five other historical entities are evaluated. The Potter Hotel footbridge, the Chapala Street Bridge, the Sandstone Diversion on the reach of Mission Creek between Montecito and Chapala Streets, the Hotel Californian Garage (15 West Mason Street), and the Moreton Bay Fig Tree. The Potter Hotel footbridge, and the Hotel Californian Garage may be removed to accommodate the proposed channel widening. All historic buildings and structures in the area of potential effects that will be affected by the proposed channel widening project are enumerated in Section 18.

5.4 SUMMARY OF ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE:

5.5.1 **Biological Resources:**

R The preferred plan for bank stabilization, a riprap slope extending to the bank top from low channel walls, would allow planting of a narrow but viable corridor of native riparian vegetation. A canopy consisting of several species of native trees, and an understory layer consisting of willows and other native perennial species would be planted. Overall, habitat restoration of Lower Mission Creek would restore a significant wildlife corridor to this coastal stream.

R Removal of concrete surfaces from many places along the creek and restoration of a natural bottom would enhance aquatic habitats along the creek. Placement of large boulders for the purpose of dissipating stream flow energy would also promote stream conditions favorable to all fish and benthic organisms. Expansion of the creek channel below Yanonali Street would increase the habitat available to tidewater gobies. Various structural adaptations of the walls would mitigate for unavoidable, but not significant effects on gobies and steelhead. These features, and the maintenance techniques which have been developed, would yield an important measure of incidental ecological benefit.

R Construction of flood control structures along Mission Creek would cause significant, temporary impacts to the stream's bottom, and thereby to the low-quality aquatic habitat which exists along the channel. Similarly, significant and temporary impacts would occur to coarse, weedy vegetation along the banks. Solitary, stately native trees would be removed in two locations to accomplish construction.

Direct impacts to gobies would be minimized by slowly de-watering half the channel at a time to allow construction in dry conditions. This plan would entail enclosing half of channel at its lower end with sheet piling, then trapping as many fish as possible and removing them to the other side of the piling. The process would be repeated for the other half of the channel. Impacts to steelhead would be avoided, or minimized, by scheduling construction in the channel and along the banks during the summer and fall months, when steelhead would not normally be present.

Direct mechanical injury of fish or indirect but adverse effects such as impaired respiration caused by greatly increased turbidity could have impacts to steelhead while construction is underway in these upper waters of the project area. Measures to avoid or minimize unavoidable impacts include scheduling construction work outside the migration period, on-site monitoring for and supervised relocation of young salmonids encountered unexpectedly, temporary barricades at the upstream end of sections under construction to exclude smolt sized fish, or temporary use of a pilot channel through the current construction area screened at its upper end to block smolt-sized fish. Any fish netted and relocated would sustain adverse and temporary effects.

Construction effects have the potential to damage small roots of the Moreton Bay Fig, but not the principal components of its root system. Construction would occur sufficiently far from it to avoid any direct impact to its buttress roots, trunk, or branches. The flood control structure should have no effect on subsurface water flow around the fig tree.

Cultural Resources:

Alternatives 6, 8, and 12 have the potential to require removal of a number of historic structures. The City of Santa Barbara awarded a contract to conduct an updated architectural survey of the affected environment in the area of potential effects (APE). The survey report, completed in November 1999, recommended buildings and structures which should be determined eligible for the National Register, California Register or local listing. There are potential adverse effects under the National Historic Preservation Act for Alternatives 6 and 8. There are none for Alternative 12. Mitigation of adversely affected historic properties under Alternatives 6 and 8, may consist of historic recordation of the locally significant historic

properties, and possible relocation of important houses. Archeological and Native American monitors will be on-site during all ground disturbing activities to ensure that if any Native American materials or deposits are discovered, the Corps of Engineers and the City of Santa Barbara will be notified immediately.

SECTION - 6 - GEOLOGY

A geotechnical evaluation of the site without project conditions for the proposed flood control project on Lower Mission Creek was conducted by the Geotechnical Branch of the Corps of Engineers. The geotechnical report is enclosed in the Main Report as Appendix B. The report describes the known geological conditions, preliminary design considerations and lists the sources of materials. Prior to the construction of the project, it is essential to conduct necessary geotechnical evaluation to develop design parameters and construction conditions.

6.1 SITE TOPOGRAPHY:

Mission Creek is located on the southern slope of the foothills of the Santa Ynez Mountains. The stream originates in the mountains, crosses the foothills and flows through the City of Santa Barbara via a meandering course and a flat alluvial plain near the Pacific Ocean. The Santa Ynez Mountains are part of the east-west trending Transverse Range geologic province, and they are complexly folded and faulted within the project area. These mountains are composed of mainly igneous and sedimentary rock. The maximum elevation of these mountains behind Santa Barbara is about 4,000 feet.

The existing topographical environment adjacent to the lower reaches of Mission Creek is relatively flat, ranging from a 50-foot elevation at Carrillo Street to sea level at the outlet. Mission Creek bisects the City of Santa Barbara. The creek is narrow, usually between 40 and 50-feet wide, with dense urban land uses occupying most of the floodplain right up to the creek bank. The natural creek bank is fragmented by flood control features, including gabions, sacked concrete, piled stone, pipe and wire revetment and bulkhead structures. The creek bottom is made up of large cobbles, sand and some overflow of concrete from flood control structures. There are no unique or unusual geological features related to Mission Creek.

6.2 EXISTING GEOLOGICAL CONDITIONS:

6.2.1 Regional Geology:

Near the city of Santa Barbara, the Santa Ynez Mountains are composed of Quaternary and Tertiary age sediments. The Tertiary sediments are marine and non-marine sandstone, shale and conglomerate. The beds generally dip southward toward the ocean, and range from well-cemented to poorly-cemented. The Quaternary sediments are non-marine and marine. The non-marine sediments are poorly cemented conglomerates, including boulders and gravels, and are prominent in portions of the foothills and form most of Mission Ridge. Stream bed and alluvial fans of Lower Mission Creek are of Quaternary age and mainly consist of alluvial materials ranging from coarse gravel to boulders. Near the Pacific Ocean shore, mainly silt and clay soils are found. Intermediate materials such as silt, sand and gravel are also present throughout the alluvial plain. The marine sediments are beach, estuary and lagoon deposits found close to the ocean. The alluvial materials vary in thickness from 200 feet just south of the Mission Ridge - Arroyo Parida Fault to more than 1,000 feet at the Pacific Ocean. The Tertiary bedrock is approximately 40,000 feet thick in the Santa Barbara area, and is underlain by an older basement

complex. See Plate 1 for the Regional Geologic Map in the Geotechnical Report, Appendix B of the Main Report.

6.2.2 **Existing Seismicity and Earthquakes**:

The geological structure of the project area consists of mountain ranges, valleys, faults and folds. The project area is located near two major parallel faults, the Santa Ynez to the north, and the Mission Ridge-Arroyo Parida to the south. These east-west trending structures are the result of regional, tectonic compressional stress associated with the San Andreas Fault Zone.

Numerous historically active and potentially active faults occur between the San Andreas Fault Zone and the Channel Islands. Faults in the immediate area of the city of Santa Barbara include the Mesa Fault, Montecito Fault, Sycamore Fault, Lavigia Fault, and Lagoon Fault. See details on fault location in the geotechnical report.

Historic Earthquakes. Nineteen earthquakes with Magnitudes of 6.0 or greater have occurred within a 100-mile radius of the project area in the last 96 years. However, prior to 1932, only six earthquakes having a magnitude of 6.0 or greater occurred within a fifty-mile radius of the project area. In 1812, the largest earthquake known to have occurred in the Channel was an estimated Magnitude 7.0+ event which occurred between Santa Rosa Island and San Miguel Island, about 16 miles south and west of the project area. This event caused a great deal of damage to Santa Barbara (U.S.G.S, 1975). The event which caused the most damage to the Santa Barbara area in recent years was an estimated magnitude 6.8 event in 1925, located about 12 miles south of the project area in the Santa Barbara channel. In August 1978, a Magnitude 5.1 event occurred about 3-1/4 miles southwest of the project area in the Santa Barbara Channel. This was the closest magnitude 5+ event to the project area (see details in Geotechnical Appendix).

6.2.3 **Potential Seismicity.**

The various active faults for future earthquakes are the San Andreas, 39 miles northeast of the project, and the various east-west trending faults which lie in the Santa Barbara Channel up to 25 miles south of the project area. A Magnitude 8.0 event on the San Andreas Fault would cause an estimated bedrock acceleration of 0.11g at the site. A Magnitude 7.1 event on the nearby Red Mountain fault, located about 10 miles from the site, would cause an acceleration of 0.34g at the site. An event of 6.0 on the potentially active Mesa-Rincon Creek fault, about 3/4 to 1 mile from the site would cause a bedrock acceleration in excess of 0.5g at the site. An event of similar magnitude on any of the other nearby active Santa Barbara Channel faults would cause an acceleration of at least 0.28 to 0.35g at the site (Geotechnical Appendix).

6.2.4 **Tsunamis**.

Tsunamis are sea waves believed to be generated by large offshore earthquakes, volcanic eruptions and/or large submarine landslides. All low lying coastal areas of California are subject to the threat of tsunamis, but the hazard for Santa Barbara is moderate, depending upon tidal conditions. This is based upon previous history, distant great earthquakes and local offshore events. The hazard from tsunamis is greatest if the highest high tide of the month and the tsunami are coincident. See the Geotechnical Appendix for details on occurrence of tsunamis

within the project area.

6.2.5 **Geotechnical Conditions of Lower Mission Creek Channel**:

The area surrounding the existing channel is composed of Quaternary non-marine and marine sediments varying in thickness from 600 to 800 feet, overlying Tertiary non-marine and marine bedrock. The non-marine sediments are alluvium, derived from the nearby Santa Ynez Mountains. These sediments are Holocene deposits overlying Pleistocene older alluvium. The most recent alluvial deposits are the streambed deposits that are typically poorly graded sands and gravels, with cobbles to 9 inches in diameter. The older alluvial deposits are composed of sands and gravels and are encountered only at depths approaching 30 feet.

The marine sediments are lagoon, estuary and beach deposits. The lagoon and estuary sediments are composed of gray, blue-gray and black silty sands, clayey sands, sands, sandy clays, and lean clays, with organic odors. Overlying the marine deposits are approximately 1 foot of poorly graded sands and gravels to 3 inches. The beach materials beyond the mouth of the proposed channel improvement are visually described as fine to medium grained sand-silty sand.

6.3 CITY OF SANTA BARBARA GENERAL PLAN AND LOCAL COASTAL PLAN GOALS AND POLICIES FOR SEISMIC SAFETY AND GEOLOGIC HAZARDS:

Applicable goals and policies for geologic hazards and seismic safety are provided in the following paragraphs.

Goals:

The Seismic Safety/Safety Element is focused on analyzing existing geologic, flood, earthquake related, fire and other life-threatening considerations and developing means of avoiding or preparing for disasters related to these concerns. The following are recommended major goals for adoption:

To protect life, property and public well being from seismic and other geologic hazards.

To reduce or avoid adverse economic, social, and environmental impacts caused by geologic conditions.

6.4 IMPACTS ON GEOLOGICAL RESOURCES:

Impacts would be considered significant if the project is located within a fault hazard area without performing appropriate seismic-geologic investigations, if construction methods failed to meet seismic standards, or if the project will result in loss of life, property and public well being from seismic and other geologic hazards.

6.4.1 **Alternative 1 (No Action):**

The No Action Alternative would not have any impact on geological resources and seismic factors.

6.4.2 **Alternatives 12, 6 and 8**:

Prior to project construction, geotechnical studies will be conducted and seismic factors and construction methods would be considered in reconfiguration of the channel, its earth-bottom, and side-slope stabilization. The project would not result in loss of life and property from seismic and other geologic hazards. For all alternatives, seismic factors and construction methods will be examined and implemented to conform to seismic standards and would be incorporated into the project design (see details in Geotechnical Appendix, Section 8).

R The analysis in this section considered that the design of each alternative would incorporate a number of measures to reduce potential effects from groundshaking, including adherence to guidelines from the Uniform Building Code (UBC), the Division of Safety of Dams (DSOD), local grading ordinances, current seismic design specifications of the Structural Engineering Association of California (SEAOC), various others regulatory requirements, and the recommendations of additional site-specific geotechnical investigations.

Topography

Construction of the flood control improvements would alter the existing creek and its topographical gradient by excavating areas to increase the channel capacity. These activities would not substantially alter the regional topography. Therefore, changes to the creek would result not result in adverse impacts to local topographical characteristics.

Proposed operations and maintenance activities would result in clearing sediment out of the project reach about once every there years. These activities would not change the depth of the created invert or alter the surrounding topographical features. Adverse effects to regional or local topography would not occur during operation and maintenance activities.

The project would incorporate standard Best Management Practices (BMPs) and other erosion-prevention measures during construction activities (refer also environmental commitments identified in Section 7, Water Resources). The project would incorporate landscaping compatible with the immediate surroundings, such as indigenous native plant material. No significant soil-related impacts would occur during construction or maintenance activities.

Ground Acceleration and Ground Shaking

The various active faults for future earthquakes are the San Andreas, 39 miles northeast of the project, and the various east-west trending faults which lie in the Santa Barbara Channel up to 25 miles south of the project area. Although the study area is subject to high seismic forces, the channel alignment is parallel to, not crossed by, the major faults in the area. While the channel could be damaged (by cracking and/or some vertical displacement) during a seismic event, it is unlikely to be rendered ineffective during such an event.

In order to minimize the risk of potential damage from ground acceleration and ground shaking associated with a major earthquake, the project design and specifications would incorporate measures from current seismic design codes. Operations and maintenance activities are not expected to result in any seismic-induced hazard. Therefore, the potential impact would be less than significant.

6.4.3 Future Sediment Removal:

Details about the anticipated pattern of sediment deposition or erosion in various project reaches has been identified (Section 3.5, EIS/EIR). Sediment deposition or erosion is dependent upon the intensity of the storm event. Eroded creekbed would be maintained during future maintenance. Prior to filling the scoured creekbed, a qualified biologist would evaluate the site and ensure that there would not be any adverse impacts to biological resources. Future sediment removal would not have any impact on geological resources.

6.5 Mitigation Measures

Erosion and sediment control measures will be implemented by the construction contractor in the project area and upstream of the project limits to prevent sloughing of materials into the flood control channel during construction. The contractor will also implement BMPs to reduce the potential for erosion and increase slope stabilization. The following specific mitigation measures will be implemented by the construction contractor and will further reduce adverse but not significant impacts.

- Surface roughening and terracing of the steep slopes along both sides of the channel will reduce erosion potential by decreasing runoff velocities, trapping sediment, increasing infiltration of water into the soil, and providing a more stable slope for revegetation.

- Altered slopes will be stabilized by construction of a short wall and riprap, planted vegetation would be irrigated to ensure growth success.

- Grading plans will incorporate the following short-term erosion control measures to control sloughing of materials into the channel during construction activities and establishment of a permanent vegetation cover.

  - silt fences, gravel bags, or rock filter berms will be placed below the toe of slopes to prevent sloughing of materials into the channel.

  - fiber rolls or sediment logs will be placed along the face of exposed and erodible slopes to shorten slope length or at grade breaks where slopes transition to steeper slopes.

The project would incorporate standard Best Management Practices (BMPs) and other erosion-prevention measures during construction activities (refer also environmental commitments identified in Section 7, Water Resources). The construction contractor would prepare a Storm Water Prevention Plan to prevent project related erosion. The project description already includes a requirement for complete geotechnical, seismic and soils analysis and inclusion of the recommendations in the final project design.

6.6 RESIDUAL IMPACTS:

There will be no residual impacts.

SECTION - 7 - WATER RESOURCES

7.1 EXISTING WATER RESOURCES:

Surface water quality in the upper canyon areas, above urban development, is generally considered very good. Water quality deteriorates, however, as Mission Creek flows through the city of Santa Barbara to the ocean. A shallow groundwater aquifer and a deep groundwater aquifer underlay the area. The shallow aquifer is subject to surface pollution and is, therefore, not considered suitable for domestic drinking water. Most of the wells in the Santa Barbara area are drilled within the deep aquifer and yield water suitable for domestic use. According to a U.S.G.S. study (Water Supply Paper 2197, 1984), 9 of 30 wells sampled yielded total dissolved solids (TDS) concentrations near or at the inferior quality level (1000 mg/l). These wells were usually high in chloride concentrations in excess of the U.S. Environmental Protection Agency (EPA) recommended limit. Ocean water was determined to be the source of the degraded water yielded by 6 of the 9 wells, due to sea water intrusion.

The Mission Creek drainage area is the largest of several coastal stream systems in the Santa Barbara area (Kaufman, Bontrager, and Pierce 1986). Mission Creek and its major tributary Rattlesnake Creek originate north of the city of Santa Barbara in the Los Padres National Forest in the Santa Ynez Mountains. Mission Creek and its tributaries drain a watershed of approximately 12.2 square miles.

The headwaters of Mission and Rattlesnake Creeks are at an elevation of 3,985 feet. The upper reaches of these creeks, which are largely natural, flow through steeply sloped canyons with lush riparian habitat. Debris basins have been constructed on Upper Mission Creek and on Rattlesnake Creek. These debris basins are cleaned out approximately every 6 years by the Santa Barbara County Flood Control District (SBCFCD) (U.S. Army Corps of Engineers, 1986). The channel in the lower reaches of the creek is cleared of vegetation every few years by the SBCFCD (Pers comm., Karl Treiberg, SBCFCD). The upper portions of Mission Creek and Rattlesnake Creek either are perennial or consist of isolated pools which receive water from subsurface flows. The lower reaches of the creek are typically dry from early summer to the beginning of the following wet season (Cooper and Hemphill, 1984). Natural flow patterns are sometimes altered by releases from Gibraltar Reservoir.

7.1.1 Surface Water Quality

Surface water quality in the upper portion of Mission Creek is reported to be good (URS Greiner Woodward-Clyde, 1999). Water quality degrades along the mid and lower reaches of Mission Creek as the gradient becomes less steep and the environment becomes increasingly urbanized. The lower portions of Mission Creek pass through the urban area of the City of Santa Barbara. From State Street downstream to the Pacific Ocean, most of Mission Creek has been modified (Kaufman, Bontrager, and Pierce, 1986). The natural flow patterns of Mission Creek

have been changed to accommodate urban development (City of Santa Barbara, 1985). Although vegetated habitat still exists within the project reach, it consists mostly of non-native species including arundo (a noxious invasive species of giant reed). The creek bed and slopes have been altered by a variety of flood control structures, including gabions, sacked concrete, piled stone, pipe and water revetment, and, near the ocean, bulkhead structures. Residential and commercial developments abut the creek. Surface water, which is typically present during the winter to spring wet season, consists of flows from the upper reaches of Mission Creek and Rattlesnake Creek, as well as stormwater runoff from the surrounding urban areas. The runoff from urban areas would be expected to be of poor water quality. Stormwater pollutant loading (i.e., the amount of pollutants washed off by stormwater runoff) are influenced by the area rainfall pattern, the total area of the drainage basin, and the distribution of different land-use types in the drainage basin (Woodward-Clyde Consultants, 1990). Contaminants which are likely to be of particular concern in urban runoff include oil, grease and inorganic pollutants, especially lead, zinc, and copper. Pathogens, total suspended solids and nutrients can also be a problem in urban runoff. Table 7.1-1 contains estimates of typical pollutant concentrations in stormwater runoff from different types of land use areas. Typical in southern California urban areas, the highest pollutant loads in storm runoff occur during the first major storm of the year when contaminants that have accumulated during the dry season are washed into drainages (SCAG, 1988).

On October 2, 1998, a field reconnaissance of the stream was conducted by wading the subject reach from the Canon Perdido Street Bridge to the Highway 101 Bridge. At this point, the water was too deep to continue wading and the rest of the reach from the Highway 101 Bridge to the State Street Bridge was observed from various vantage points along the stream banks. Observations and field notes were made, and photographs were taken to record conditions along the stream.

The most obvious vector for transporting contaminants to the creek within the subject reach is stormwater runoff. Visual inspection of the subject reach revealed large stormwater discharge pipes beneath every bridge. Very little potential exists for overland surface runoff to enter the creek in this area. The majority of the creek banks are armored either with poured concrete, stacked cement-filled bags, or with stacked and grouted rock (floodwalls). Drainpipes have been incorporated as an integral part of the design of these floodwalls. No observations were made of "illicit" discharge pipes likely to convey either hazardous liquids (e.g., solvents, fuels, or lubricants) or common household wastes to the creek. The flood wall-related drain pipes appeared to have been designed to serve the purpose of preventing groundwater destabilization of the armoring during storm events.

The stormwater discharge pipes underneath the bridges convey to the creek any contaminants entering the existing stormwater collection system from up gradient streets and impervious surfaces. The creek flood wall drain pipes appear to collect and discharge stormwater as it flows through the subsurface soils toward the creek.

TABLE 7.1-1
ESTIMATES OF TYPICAL POLLUTANT CONCENTRATIONS IN STORMWATER RUNOFF FROM URBAN AREAS AND HIGHWAYS

Pollutant*	Residential	Commercial	Mixed	Open	Highway
TSS	101.0	69.0	67.0	70.0	142.0
BOD	10.0	9.3	7.8	6.0	14.0
COD	73.0	57.0	65.0	40.0	114.0
Total P	0.383	0.201	0.263	0.121	0.400
Soluble P	0.143	0.080	0.056	0.026	0.200
TKN	1.900	1.179	1.288	0.965	1.830
NO2+NO3	0.736	0.572	0.558	0.543	0.760
Total Cu	0.033	0.029	0.027	0.030	0.054
Total Pb	0.144	0.104	0.114	0.030	0.400
Total Zn	0.135	0.226	0.154	0.195	0.329

Source: Final Report of the Nationwide Urban Runoff Program, Prepared by Woodward-Clyde consultants for Water Planning Division, U.S. Environmental Protection Agency, December 30, 1983.
*TSS - Total Suspended Solids; BOD - Biological Oxygen Demand; COD - Chemical Oxygen Demand; P - Phosphorus; TKN - Total Kjeldahl Nitrogen; N02 - Nitrate; N03 - Nitrite; Cu - Copper; Pb- Lead; Zn - Zinc.
Pollutant Loading and Impacts from Highway Storm Runoff, Prepared by Woodward-Clyde consultants, for the U.S. Department of Transportation, Federal Highway Administration. Report No. FHWA/RD-88-007, April 1990.

Another obvious source of contamination is the use of the creek as a disposal site by area residents and/or others. The field reconnaissance of the creek revealed a wide variety of trash and foreign items within the creek channel. These included numerous empty motor oil and motor coolant containers, empty bottles of all types, numerous shopping carts, discarded bicycles, cartons and containers from a recently used camp site under a bridge.

The water sampling plan called for taking samples from the creek during low flow conditions during late summer or early fall and then obtaining subsequent samples during higher flow conditions following several rain events at a later date. The sediment sampling plan requires only one sediment sampling event at each sampling site.

Sampling during low flow conditions occurred during late September and early October 1998. On September 25, 1998, water samples and streambed sediment samples were taken at three locations along Lower Mission Creek (Figure 1). These locations were: Site #1 - approximately 30 yards west of the State Street bridge north of Cabrillo Boulevard; Site #2 - at West Gutierrez Street approximately 60 yards below the downstream side of the bridge; and

Site #3 - at West De la Guerra Street approximately twenty feet below the downstream side of the bridge. Global Positioning System coordinates for these locations were noted. They are: Site #1- N34^{N} 24' 44.26", W119^{N} 41' 26.75" ; Site #2 - N34^{N} 24' 48.78", W119^{N} 41' 42.99"; and Site #3 - N34^{N} 24' 57.64", W119^{N} 42' 11.98".

On October 2, 1998, water samples were taken from the same locations as were sampled on September 25. Water sampling under high-flow conditions occurred on February 10, 1999, following moderately heavy rainfall which occurred on February 9. Water samples were taken at the same locations as during the earlier (low-flow) effort. Possible HTRW constituents of concern (analyses) and laboratory analytical methods employed to identify them and quantify their concentrations (if present) are listed in Table 1 of Appendix F.

7.1.2 **Water Sample Analysis**:

Results of the laboratory analysis of the water samples taken from the three sampling locations during September and October 1998 are provided in Tables 3 - 5 in Appendix F. Almost all analyses were below the detection limits for the prescribed analytical techniques. No organochlorine pesticides, polychlorinated biphenyls, or poly nucleated aromatic hydrocarbons were detected at any of the three sampling locations. The same was true for metals and non-metals with the exception of location #1 where lead was reported at a concentration of .0090 parts per million (ppm) (detection limit is .0050). There is no recognized Maximum Contaminant Level (MCL) for lead in drinking water. EPA's current National Primary and Secondary Drinking Water Regulations do not indicate/recommend remedial action until concentrations reach .015 parts per million.

Concentrations of Tributyltin just above detection limits (2 parts per trillion[ppt]) were found at all three locations. Reported concentrations were 3.7, 4.2, and 13 ppt at locations #1, #2, and #3 respectively. Tributyltin is a biocide, antifoulant, and disinfectant used in paints, cooling towers and other applications to prevent growth of organisms such as barnacles, algaes, and other biota considered to be economic pests in certain situations (Source: Farm Chemicals Handbook, Richard T. Meister, Editor in Chief, Meister Publishing, Co. Willoughby Ohio, 1990). There is no current MCL related to the substance.

7.1.3 **Sediment Sample Analysis**:

Results of the laboratory analysis of the sediment samples taken from the three sampling locations during the late fall are provided in Tables 7 and 8 in Appendix F. Almost all analyses were below the detection limits for the prescribed analytical techniques. No organochlorine pesticides or polychlorinated biphenyls were found at any of the three sampling locations. No poly nucleated aromatic hydrocarbons were detected at locations # 1 or #2. At location #3, concentrations just slightly greater than detection thresholds were reported for Ben(a)anthracene (4.6 ppb), Benzo (a)pyrene (3.3 ppb), Benzo(b)fluranthene, (at detection limit of 2.0 ppb), Chrysene (7.3 ppb), Phenanthrene (6.9 ppb), and Pyrene (7.1 ppb). Although MCLs are applicable to drinking water, not sediments, they can provide a relative reference for interpreting the analytical results in the absence of other standards. However, no MCLs exist for these substances with the exception of Benzo(a)pyrene which has an MCL of zero and an action

threshold of .0002 parts per million. The analyte Fluoranthene was reported at location # 3 at a concentration of 20 ppb. No MCL exists for this substance nor does the EPA report any Preliminary Remedial Goals (PRGs) for this substance.

Total Recoverable Oil and Grease and Total Petroleum Hydrocarbons were reported in noticeably greater concentrations than the detection threshold of 5 ppb. At location #1, they were reported at 75 and 59 ppb respectively. At location # 2, they were reported at 110 and 76 ppb respectively. At location # 3, they were reported at 270 and 210 ppb respectively. No MCLs were found for oil and grease, and the CCRWCB Basin Plan does not address contaminants in sediments. No EPA PRGs were found for Oil and Grease.

Chromium, Copper, Lead, Nickel, and Zinc were all reported at concentrations noticeably above the detection thresholds with concentrations trending higher toward the downstream reaches of the creek. Drinking water MCLs for these substances are reported as follows: Chromium - .1 ppm, Copper - 1.3 ppm, Lead - zero ppm, Nickel - no MCL (the EPA's PRG is 1500 ppm), and Zinc - no primary MCL, but a secondary standard of 5 ppm. National ranges of native soil concentrations (ppm) for these elements are reported as follows; Chromium - 5.0-3000, Copper - 2.0-100, Lead - 2.0-200, Nickel - 5.0-1000, and Zinc - 10-300.

7.1.4 **Discussion of Water and Sediment Sample Analyses**:

Water

As stated above, results of the initial water sampling event were that almost all analyses were below the detection limits for the prescribed analytical techniques. No organochlorine pesticides, polychlorinated biphenyls, or poly nucleated aromatic hydrocarbons were detected at any of the three sampling locations. Additional sampling will take place during the high stream flow period winter months. In addition, the County and City of Santa Barbara are conducting water quality tests in the same reach of the creek to provide background data for development of a joint stormwater pollution prevention plan. The results of those efforts will also be available for review, comparison, and consideration. The County was able to sample during the drier part of the year (which will be comparable with the first phase sampling analyzed above) and was able to obtain water samples immediately following the first storm of the year (first flush samples) (pers Comm Dan Reed, Supervisor, County of Santa Barbara Health Services Department). The first flush samples are generally recognized as potentially containing the highest level of contaminants of the year and should be a good indicator of the high end of contamination potential for stormwater runoff.

One analyte which was found in levels greater than detection limits, Tributyltin (TBT) has the potential to be problematic to aquatic organisms. According to EXTOXNET primary files maintained and archived at Oregon State University, TBT is highly toxic to crustaceans and molluscs. Concentrations as low as 3 ppt were found to adversely affect the mud snail and dogwhelk. Larvae are generally more sensitive to this substance than are adults. Freshwater species bioaccumulate more TBT than will marine organisms. Juvenile chinook salmon accumulate TBT immediately upon exposure (Source: http//ace.orst.edu/cgi-bin/mfs/01/pips/tributyl.htm?181#mfs). No information was found regarding TBT effects on steelhead (a Federally listed endangered species which purportedly exists in Mission Creek). As

stated above, TBT is an important ingredient in many marine paints and pesticides; however, it is unknown whether the release to Lower Mission Creek was from a point or non-point source.

Sediment

It is unknown whether the release of Polynuclear Aromatic Hydrocarbons (PAH's) to Lower Mission Creek was from a point or non-point source at sampling location # 3. PAH's are by-products of combustion and the low concentration levels reported in this location could have originated from a variety of sources including discharge of bar-be-que ashes or burn pile debris into the creek.

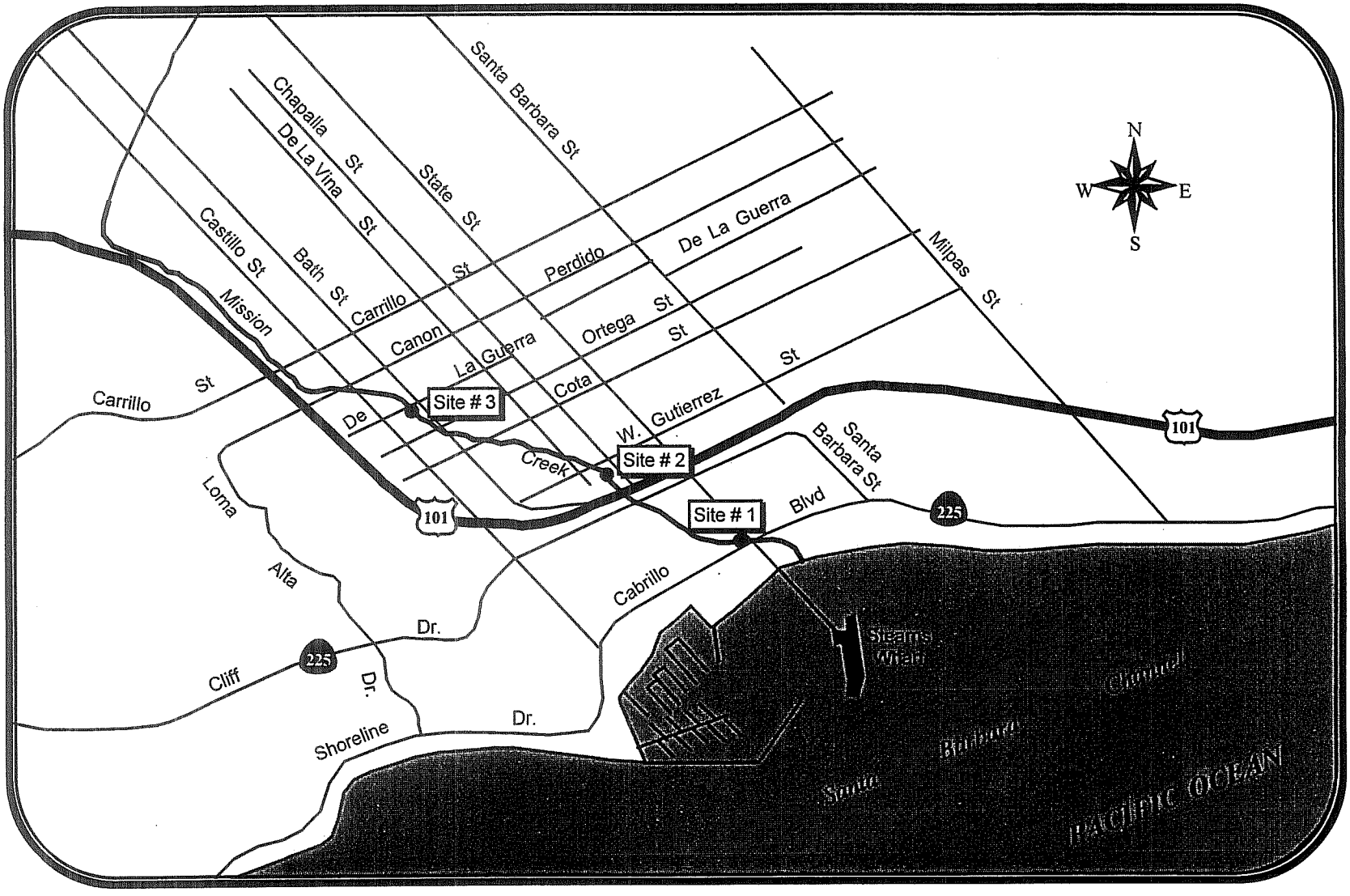
It is also unknown whether the release of oil and grease at sampling locations # 2 and # 3 was from a point or non-point source. A number of explanations of the possible sources are plausible. The reported concentrations are consistent with the discharge of used motor oils and lubricants into the creek in these areas. As discussed above, there was ample visual evidence of this practice during the field reconnaissance of the subject reach. An analysis of the first flush water samples for these contaminants could provide clues as to the possible source of discharge. No published regulatory criteria for oil and grease in sediments are known.

The levels of Chromium, Copper, Lead, Nickel and Zinc were well within the natural occurring background levels occurring in soils nationally. The Central Coast Regional Water Quality Control Board's (CRWQCB) Basin Plan is silent on the issue of sediment contamination. Since these contaminants were not found during the water sampling effort, it is possible that they are fixed in the sediment matrix and would not be readily absorbed by aquatic organisms. These metals would not appear to play a significant role for survival of adult fishes and other free swimming aquatic organisms. However, to the extent that spawning activities would occur in sediments containing even these relatively low concentration levels, spawning success and fry survival could be negatively affected. Aquatic organisms which feed within the creek sediments could also be adversely affected. To the degree that these contaminants could bio-accumulate through the food chain, survival of aquatic organisms could be adversely affected. It is assumed that U.S. Fish and Wildlife Service fisheries biologists would have access to information regarding the significance of the reported concentrations of these metals on endangered steelhead.

7.2 County and City of Santa Barbara Joint Stormwater Pollution Prevention Plan (SWPP):

7.2.1 Background:

In anticipation of developing the SWPP and in response to information indicating occurrence of elevated levels of bacteria within South Coast area watersheds (CRWQCB 1991 and 1992), a watershed characterization study has been undertaken. The overall objective of the study is to establish baseline pollutant concentration levels to enable development of a comprehensive approach to improving watershed water quality. The study focus is on watersheds in the South Coast area and includes Arroyo Burro, Carpinteria, Mission, and Rincon Creeks. A brief letter report has been prepared summarizing the results of data analysis and presenting any



Not to Scale

Jones & Stokes Associates, Inc.

Figure 7.1-1

Vicinity Map and Sampling Locations

proposed modifications to the study. The summary provides supportive rationale and recommends appropriate Best Management Practices for identified pollutants. All data is compiled and presented in a final report. Data will be compared to results from other studies in the state.

7.2.2 **Methodology**:

R The first of four sampling events to occur within each watershed began in August 1998. The first event was timed to occur concurrently with sampling events being conducted as part of the Southern California Coastal Water Research Project. The second sampling event took place during the "first flush" of the storm season because runoff from a season's first storm (of rainfall > 1/4") is considered to carry the highest pollutant concentrations of the year and is an important consideration in development of a SWPP. The third sampling event occurred mid-season (January) and the fourth event occurred at the end of the storm season (March). Sediment samples were taken during low flow conditions because it is under these conditions that pollutant levels would be most concentrated in the sediments. High flows have a tendency to wash the sediments and actually lower concentrations of even low solubility pollutants. Water samples were taken as specified during low flow conditions as well as immediately after the first storm of the season in an attempt to catch "first flush" pollutant runoff.

The timing of sampling events followed NPDES permit application guidelines. The baseline samples are collected during the dry season and the others are triggered by storm events. The guidelines require sampling periods to be a minimum of one month apart and specify that storm events not vary more than 50% from the historical average or median rain events.

Analyses included metals, general/physical characteristics, and nutrients. Analysis was not continued for constituents for which concentrations fall below the CRWQCB's Basin Plan Standards. Constituents which are present in concentrations greater than or equal to these standards will continue to be evaluated throughout the study.

Analyses for Mission Creek include: **Total Metals** - Cadmium, Chromium, Copper, Lead, Nickel, Zinc, and Mercury; **General/Physical**- Biological Oxygen Demand, Chemical Oxygen Demand, Total Organic Carbon, Free Oil and Grease, Oil and Grease (mineral): **Nutrients** - Total Phosphorous (P), Total Nitrogen, Nitrate, Nitrite, and Ammonia; and **Microbiological** - Fecal Coliform and Enterococcus.

There are 10 sampling locations along Mission Creek starting near the mouth and ending near the source. Two of the sampling locations on Lower Mission Creek coincide with those of the Corps effort. The sampling locations 1 and 2 coincide with the Corps sites # 1 and # 2 (Source: South Coast Watershed Characterization Workplan).

7.2.3 **Sampling Results**:

Analysis of samples taken at locations 1 and 2, on August 31, 1998, found no detectable concentrations of metals (with the exception of zinc concentrations) at or exceeding the detection limits established in the Corps study. No fecal coliform bacteria were detected.

Analysis of "first flush" samples collected on September 5, 1998 (sites 1 and 2) and September 6, 1998 (site 1), found no detectable concentrations of metals (with the exception of zinc) at or exceeding the detection limits established in the Corps study. Fecal coliform bacteria in excess of the maximum recommended CRWCB Standard for water contact recreation were found at both sites 1 and 2. The standard is 200/100ml of water and concentrations of 12,977 and 24,192 were found at site 1 on September 5 and 6, 1998 respectively. Concentrations of 2987 were found at site 2 on September 5, 1998. The maximum recommended CRWCB Standard for water recreation with no body contact is 2000/100ml.

Analysis of mid-season samples collected on January 28, 1999 (site 1) found no detectable concentrations of metals (with the exception of zinc) at or exceeding the detection limits established in the Corps study. Fecal coliform bacteria in excess of the maximum recommended CRWCB Standard for water contact recreation were found at both sites 1 and 2. The standard is 200/100ml of water and concentrations of 41,600 and 32,820 were found at sites 1 and 2, respectively, on January 28, 1999. The maximum recommended CRWCB Standard for water recreation with no body contact is 2000/100ml.

Analysis of end of the storm samples collected on March 16, 1999 (site 1) found no detectable concentrations of metals at or exceeding the detection limits established in the Corps study. Fecal coliform bacteria in excess of the recommended CRWCB Standard for water contact recreation were found at both sites 1 and 2. The standard is 200/100ml of water and concentrations of 9,208 and 3,076 were found at sites 1 and 2, respectively, on March 16, 1999. The recommended maximum CRWCB Standard for water recreation with no body contact is 2000/100ml.

7.3 **Water Quality at Lagoon**:

At the outlet of Mission Creek is a tidal lagoon. This lagoon portion of Mission Creek tends to accumulate debris and stagnant creek water because the flow of water is often insufficient to clear the sand "plug" at the mouth (City of Santa Barbara, 1981). This lagoon area, which accumulates the water which flows through the City of Santa Barbara, is likely to be of low water quality. Decomposing debris could cause lowered dissolved oxygen levels.

Mission Creek has been identified as a source of bacterial contamination to ocean waters during the winter months (CRWQCB, 1991). Table 7.1-2 compares bacterial input to the ocean from Mission Creek to other local sources.

Table 7.1-2
QUANTITY OF BACTERIAL INPUT
(Unit of Measurement Bacteria per 100 ml of Water)

Location	Quantity (12/17/88)
Goleta Slough	162,000.0
Arroyo Burro Creek	27,100.0
Mission Creek	19,600.0
Santa Barbara Outfall	19.5
Goleta Outfall	1.0
Source: Goleta Sanitary District	

7.3.1 **City of Santa Barbara Mission Creek Estuary Water Quality Monitoring Program**:

The City of Santa Barbara is conducted a water quality monitoring program of the Lower Mission Creek estuary. The objective of this water sampling effort was to provide baseline data which will be used to pursue a solution to the contamination, appearance and odor problems associated with the estuary. Water samples were obtained and analyzed on a weekly basis from November 1994 through October 1995. Water samples were obtained at two locations in the Mission Creek estuary: at the north side of the Cabrillo Boulevard Bridge; and at the north side of the State Street Bridge. These observations included, but were not limited to, the water level in the estuary, the condition of the sand bar, the extent of algal cover, odor, the amount of debris in the channel and any other unusual factors. Detailed water quality data and analysis results are located in Appendix F. It was estimated that some mixing was taking place during periods of low creek flow when high tides were present. This was illustrated by low salinity and conductivity readings. There was no unsightliness or foul odors associated with the creek at that time.

In late April and early May 1995, the creek flow receded and the height of the sandbar increased. The combination of these and other factors yielded increased salinity and conductivity, and decreased dissolved oxygen content in the estuary. Algal cover began to appear in mid-July. By August 3, 1995, the algal coverage had increased to about 40% of the lower estuary waters, with a corresponding drop in the dissolved oxygen content. High tides occurred on August 8-10, 1995, washing the algae out to sea. Measurements obtained a few days later revealed that the dissolved oxygen content had increased, as had salinity concentrations.

Based on this analysis, turbidity level was generally low within the creek between March and November, except during May. During the month of May, turbidity levels of 74.8 and 188 Nephelometric Turbidity Units (NTUs) were recorded. Figure 9-7 (Section 9, Biological Resources of this document) shows a graphical representation of turbidity levels in 1994 and 1995. Turbidity levels between April and November ranged from 0.76 to 14.8 NTUs (except May). Turbidity levels were recorded during the months of December to March. The increased turbidity levels resulted from winter rains/storms. The highest turbidity levels were recorded in February, ranging from 110 to 206 NTUs. Nevertheless, analyses indicated that turbidity levels were high only for few days, a maximum of about two weeks. After the storm was over, turbidity levels returned to normal and dropped to about 8.0 NTUs.

7.4 Ground Water Quality:

The proposed flood control project is located in the alluvial plain between the foothills south of the Mission Ridge-Arroyo Parida fault and the Pacific Ocean. This area is composed of two adjacent ground water basins, the Santa Barbara and the Foothill basin. The Santa Barbara Basin is adjacent to the Pacific Ocean, and the Foothill Basin is adjacent to the mountains.

Most of the rocks in the nearby mountains are sedimentary and are nearly impermeable except for some slightly permeable sandstones with occasional fracture zones. Neither is considered an important source of ground water.

Upper Mission and Rattlesnake Creeks are areas of interrupted streamflow, part of which seeps into the ground to recharge the groundwater basin to the south. The deposits underlying the Santa Barbara area have been divided into five zones. They include the shallow zone, upper producing zone, middle zone, lower producing zone, and deep zone. The shallow zone varies in thickness from 200 to 300 feet, and is not considered a source of good water. The groundwater in the uppermost zone tends to be polluted in urban areas.

Water generally stands all year long in Mission Creek from the railroad tracks and U. S. Highway 101 downstream to the Pacific Ocean. High ground water and/or tidal water will be encountered in this reach during construction.

The greatest recharge is reached in Mission Creek between Rocky Nook Park and Mission Street, a distance of 3.65 miles. Periodic releases from Gibraltar Reservoir are made to flush debris and for groundwater recharge. Downstream from Mission Street, much of the stream channel is concrete-lined, so less recharge occurs in this area. The capability for recharge due to infiltration into the streambed is also reduced as the stream flows across more fine grained deposits which naturally occur in the lower part of the drainage area. Throughout most of the basin, fine grained deposits present in the shallow zone confine or partly confine the underlying water producing zone. Clay layers present in the shallow zone also prevent significant groundwater movement between the upper water bearing units of the shallow zone, which contain saline groundwater, and the lower water bearing units of the shallow zone, which contain relatively low levels of chloride. Any recharge that would occur downstream of Canon Perdido Street would tend to be confined to the shallow zone, not allowing percolation into the upper and lower water producing zones.

The Corps' Geotechnical Branch conducted an investigation to examine the depth of groundwater within the project area. The investigation revealed that groundwater depths vary from ground surface to 10 feet below the proposed invert. The water level measurements indicate that groundwater from the shallow aquifer will be encountered during excavation of the project.

7.4.1 Seawater Intrusion:

Seawater intrusion at Santa Barbara has been jointly studied by the U. S. Geological Survey and the City of Santa Barbara since 1977. Eight monitoring wells have been constructed along the coast to provide an early warning of saltwater intrusion into each of the fresh water aquifers at two sites along the coast at Santa Barbara (Hutchinson, 1979). The rate of municipal

Table 7.1-3

Comparison of Stormwater Pollutant Concentrations in Lower Mission Creek

(Average Value of Sample Readings From Locations 1 & 2)

Pollutant	Pre-Storm 8/31/98		Post-Storm 9/5/98		11/28/98		1/28/99		3/16/99	
	Loc 1	Loc 2	Loc 1	Loc 2	Loc 1	Loc 2	Loc 1	Loc 2	Loc 1	Loc 2
Total Coliform	1600	No Data	24,192	24,192	241,920	241,920	46,110	20,980	241,920	198,630
Fecal Coliform	No Data	No Data	12,997	2,987	41,600	32,820	3,790	3,310	9,208	3,076
BOD	7	No Data	5.6	No Data	23	No Data	ND	No Data	8	No Data
COD (MPN/100ml)*	30	No Data	67	No Data	91	No Data	150	No Data	52	No Data
Total P (ppm)	.45	No Data	1.40	No Data	3.3	No Data	.57	No Data	.64	No Data
TKN (ppm)	.7	No Data	2.3	No Data	5.6	No Data	5.6	No Data	.09	No Data
NO_2+NO_3 (ppm)	2	No Data	1.9	No Data	3.9	No Data	1.7	No Data	.5	No Data
Total Cu (ppm)	ND	No Data	ND	No Data	.02	No Data	ND	No Data	No Data	No Data
Total Pb (ppm)	ND	No Data	ND	No Data	.02	No Data	ND	No Data	No Data	No Data
Total Zn (ppm)	.02	No Data	.05	No Data	.11	No Data	.01	No Data	No Data	No Data

* Most probable number per 100 ml.
** Parts per million.
*** When more than one reading was taken, the higher value is reported in this table.

Source: Joint Water Quality Study by County and City of Santa Barbara

Mission Creek has been identified as a source of bacterial contamination to ocean waters during the winter months (RWQCB, 1991). Table 6.1-3 compares bacterial input to the ocean from Mission Creek to other local sources.

pumping increased significantly, averaging about 7 acre-feet per day, from August 1978 through January 1980. This pumping caused the water levels in a large part of the Santa Barbara area to drop below sea level by January 1980. During July 1978, the ground water generally flowed southward toward the ocean, whereas by January 1980 the ground water began to flow northward away from the ocean. The U.S.G.S has stated in their study (Martin, 1984), that the northward ground water flow suggests that the increased pumping rate has created the potential for seawater intrusion in the coastal portion of the Santa Barbara area.

The study further stated that, in the past, the possibility of seawater intrusion into the deeper water-bearing deposits in the aquifers was thought to be remote because an offshore fault truncates these deeper deposits so that they lie against consolidated rocks on the seaward side of the fault. Results of the study indicate, however, that ocean water has intruded into the deeper water-bearing deposits and to a much greater extent than in the shallow part of the aquifer. Apparently, the offshore fault thought to be impermeable is not an effective barrier to seawater intrusion. The fault may be permeable, allowing ocean water to migrate along the fault zone and to come into direct contact with the water-bearing deposits at depth.

Each of the four water-bearing aquifers have been, and are still being, monitored for ground water quality. The highest chloride concentrations occur in the upper, middle and lower producing aquifers. The shallow aquifer, which will be the one affected by channel construction, has relatively low chloride concentrations. Logs have indicated that there are impermeable clay beds between this aquifer and the lower aquifers. The U.S G.S. sampled only two wells in the shallow zone in 1979 (Martin, 1984, see details in Geotechnical Appendix).

The City at one time maintained several wells near the coast, which increased saltwater intrusion problems. But in the last few years, these wells have either been capped or they are used for monitoring purposes only. In 1990, it was learned that the local interests had stopped pumping the domestic wells closest to the ocean and had developed new wells more than a mile inland, thus allowing the ground water level to rise in those portions of the basin closest to the ocean. The City manages groundwater differently than it did in the past and groundwater is also saved for drought conditions when other surface supplies are not available.

7.5 CITY OF SANTA BARBARA GENERAL PLAN AND LOCAL COASTAL PLAN GOALS AND POLICIES FOR WATER AND MARINE ENVIRONMENTS:

The following policies in the Water and Marine Environments Section of the City of Santa Barbara Local Coastal Plan and Policies apply to this project:

6.8 The riparian resources, biological productivity, and water quality of the City's coastal zone creeks shall be maintained, preserved, enhanced, and where feasible, restored.

6.9 The City shall support the programs, plans and policies of all government agencies, including those of the Regional Water Quality Control Board with respect to best management practices for Santa Barbara's watersheds and urban areas.

6.11 Channelization, dams or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to: (1) Necessary water supply projects, (2) Flood control projects where no other method for protecting existing

structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) Developments where the primary function is the improvement of fish and wildlife habitat.

These Policies will be considered during evaluation of viable alternatives. See Section 4, Plans and Policies, for analysis of these policies.

7.6 IMPACTS ON WATER RESOURCES:

Impacts to water resources would be considered significant if:

- the proposed project would consistently discharge pollutants into the creek during debris removal operations, thus reducing water quality;
- turbidity levels during excavation, construction, and periodic debris removal are significantly greater than levels encountered during floods on the creek and under anticipated future without project conditions;
- the proposed project would have a significant adverse impact on groundwater recharge or if the penetration rate of water is significantly reduced due to impervious cover at the creek bottom;
- discretionary development is inconsistent with the goals and policies of the City of Santa Barbara and Santa Barbara County's Water Quality Management Plans; or
- the proposed project is not in compliance with Federal, State, and local water quality regulations.

7.6.1 Alternative 1 - (No Action) Without Project Conditions:

In the past, sediment removal has been conducted after major storm events to provide flood protection to the City of Santa Barbara. Cleanouts have occurred over a period of about 8 to 10 days. Usually, sediment has been removed between April and October, when the water flow is minimal in the creek. These impacts have been short-term and temporary. Under the No Action Alternative, there would be no project-related change in the baseline conditions found in the water and sediment sampling efforts discussed above. To the degree that the City and County of Santa Barbara are successful in developing and implementing BMPs for reduction of stormwater-related pollution of Lower Mission Creek, concentrations of contaminants could be expected to decrease over time.

7.6.2 Alternatives 12, 6 and 8:

Excavation of the existing creek bed and banks would result in short-term impacts to water quality; turbidity levels would increase due to channel removal and excavation. However, construction activity would occur during the non-flood season. Impacts would be short-term and localized. Turbidity levels would also increase during periodic future debris removal operations which could take from 8 to 10 days to accomplish. Impacts would be short-term and localized and would not exceed turbidity levels encountered under future without project conditions.

Measures would be followed during both construction and future debris removal to minimize impacts from turbidity. For example, if water is present in the creek during construction and future sediment removal operation, creek flow would be diverted by installation of a pipe or construction of a low flow channel. Water for the project would be obtained from City of Santa Barbara sources. No polluted material would be placed in the creek. The contractor would be responsible for the cleanup of any oil or grease spilled during construction. Periodic future debris removal is not anticipated to impact groundwater recharge. With utilization of appropriate construction methods and adherence to debris removal permit requirements, Alternatives 12, 6 and 8 would not have a significant impact on water resources of the project area.

If conditions at the time of construction warrant, turbidity levels would be monitored and measures developed to ensure that levels are minimized. No polluted sediments or other material would be placed in the creek. Measures to avoid/contain spills of oil and grease would be incorporated into the project plans; the contractor would be responsible for cleanup of any oil or grease spills from construction equipment.

7.6.3 **Future Periodic Maintenance**:

It is assumed that future periodic sediment removal would be similar to the past maintenance of the creek within the project reach. It may take about 8 to 10 days at intervals that depend upon debris deposited within the creek by flood events. The anticipated increase in turbidity during debris removal operations would be similar to levels experienced during past debris removal operations (without project conditions). Construction measures, including the use of low flow channels, would be incorporated into the project to minimize turbidity and other water quality impacts to project area resources.

R The effects of future maintenance activities within the creek can be estimated, but cannot be known with precision until such activities are actually undertaken. Sampling in Lower Mission Creek has shown that turbidity typically increases within the creek during high flow events and then rapidly returns to lower concentrations when flows subside. Maintenance activities will be timed to coincide with low flow periods and BMPs will be employed to avoid excessive impacts to water quality.

7.6.4 **Impact on Ground Water Recharge**:

The creek banks would be stabilized using stepped walls, vertical walls or vertical walls with riprap. However, sideslope protection would not result in a decrease in water percolation through the sideslopes because existing sideslopes consist of various types, which include concrete wall, gabion, sand bags, armaflex, etc. In addition, most of this percolation or seepage would continue through the natural creek bed. Construction and periodic debris removal are not anticipated to have an appreciable effect on the amount of groundwater recharge through the project reach.

The impact on seawater intrusion will be almost nothing if the Corps of Engineers constructs the aforementioned channel improvements in the reach of Mission Creek from Canon Perdido Street to Cabrillo Boulevard Water generally stands all year long in the lower reach of the creek from the railroad tracks downstream to the ocean. Therefore, seawater intrusion by

tidal action has probably already occurred in that portion of the shallow aquifer which underlies this reach of Mission Creek. The effects of any further seawater intrusion into this aquifer will be minimal because this aquifer is: (1) located close to the ground surface, (50 to 200 feet deep); (2) is subject to surface pollution; (3) is not being used for domestic water supply; and (4) there is little hydraulic continuity between this aquifer and the underlying highly pumped zones. In addition, no permeable faults are expected to be intercepted by the temporarily extended construction-induced tidal flow up the channel.

The various studies indicate that improvement of the channel between Canon Perdido Street and the Pacific Ocean will have a negligible effect on ground water recharge.

7.6.5 **Compliance with Environmental Laws and Permit Requirements**:

The USACOE does not issue itself a permit for civil works projects. Therefore, a Section 404 (b)(1) analysis is prepared and included in the EIS/EIR, Appendix F. Section 404(b)(1) addresses project-related impacts to the waters of the United States. A future maintenance plan is included in the EIS/EIR, and impacts related to future maintenance are identified. Mitigation measures for project construction and future maintenance for the life of the project are included in the Final EIS/EIR for water, coastal and biological resources. Future maintenance will be performed by the Local Sponsor. The Environmental Resources Branch has coordinated with the Regulatory Branch, Ventura Field Office, on the requirement for the Section 404, Water Quality General Permit. The USACOE is planning to coordinate with the Regulatory Branch throughout construction of the proposed project.

R On December 20, 1999, Santa Barbara County submitted an application for a Section 404, USACOE Regulatory, permit with the Draft EIS/EIR (Appendix E-1). A General Permit could be renewable at intervals of 5 to 10 years or Section 404, Regulatory Permit, or Section 404, Regulatory permit could be waived.

Section 404(r) of the Clean Water Act, waives the requirement to obtain either the State Water Quality Certification or the 404 permit if (ER 1105-2-100, April 22, 2000):

a. Information on the effects of the discharge of dredged or fill material into waters of the Untied States, including the application of the section 404(b)(1) Guidelines, are included in an EIS on the proposed project; <u>and,</u>

b. The EIS is submitted to Congress before the actual discharge takes place and prior to either authorization of the proposed project or appropriation of funds for its construction.

c. District commander shall clearly document in the feasibility report when the 404(r) exemption criteria have been met, regardless of whether or not he plans to obtain State Water quality Certification.

R Future maintenance is an integral part of the project design, impacts and mitigation

measures for future maintenance are included in the Final EIS/EIR. The EIS/EIR would be submitted to Congress for authorization of the project construction and appropriation of funding. Therefore, the proposed future maintenance activities could be waived from obtaining a Section 404 Water Quality permit governed by the USACOE Regulatory Branch.

R On December 20, 1999, the USACOE and the Santa Barbara County Flood Control District submitted a request for a waiver from the Section 401 Water Quality Certification (Appendix E-1) for the proposed project. Future maintenance is a part of the project. For the life of the project, impacts related to the future maintenance are included in the EIS/EIR. By letter dated February 2, 2000, the California Regional Water Quality Control Board (CRWQCB) provided a waiver from the Section 401 Water Quality Certification for the project construction and the future maintenance (Appendix E-1).

A Storm Water Pollution Prevention Plan will be prepared to meet Section 402 Clean Water Action and National Pollutant Discharge Elimination System (NPDES) Storm Water Program requirements prior to the project construction. The selected construction contractor will prepare a Storm Water Pollution Prevention Plan to reduce erosion and degradation to waters of the United States. The local sponsor is involved in this project; therefore, a 1603 Streambed Alternation permit would be required prior to construction and the County of Santa Barbara would need to submit an application to the California Fish and Game for the Streambed Alternation Permit. With completion of these actions, the project will be in compliance with Federal and State water quality requirements.

7.6.6 MITIGATION OF POTENTIAL WATER QUALITY IMPACTS:

- *Impact:* Increased turbidity during construction.

  Mitigation: The creek channel upstream of construction activity shall be dammed temporarily to prevent water from entering the reach under construction. A diversion pipe shall be installed in the dam to convey any creek water around the construction area for discharge downstream of the construction activity.

- *Impact:* Short-term impacts to surface water quality from fuels, solvents, and lubricants associated with construction equipment.

  Mitigation: Equipment shall be in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work. Corps shall develop and implement a spill prevention and remediation plan and workers shall be instructed as to its requirements. Construction supervisors and workers shall be instructed to be alert for indications of equipment-related contamination such as stains and odors. Construction supervisors and workers shall be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan if indications of equipment-related contamination are noted. Construction equipment shall only be operated within dewatered areas of the creek. No

maintenance of construction equipment shall be carried out in the creek bed.

Impact: Project construction and future sediment removal may result in increase in the turbidity levels.

Mitigation: No construction or sediment removal would occur anywhere within the project area between December 1st and March 30th. Details of these mitigation measures include:

1) Pipe culverts will be placed in the low flow stream where the stream must be crossed on a regular basis. No work will be allowed in the flowing water except as absolutely necessary (as determined by the Flood Control District).

2) Construction of temporary low-flow channels within the creek during debris removal operations to minimize turbidity and provide habitat for aquatic species. The low-flow channels would be constructed around and away from debris removal operations. Project biologists would develop criteria for the low-flow channels.

3) Conditions identified in the applicable permits and 1601/1603 Streambed Alteration Agreement) shall be followed during construction and future maintenance as applicable.

R Impact: Stockpiled soils could erode and contaminate Lower Mission Creek.

Mitigation: Stockpiled soil needs to be placed sufficiently far back from the creek that erosion control measures can be employed. During construction, USACOE intends to employ Best Management Practices (BMPs) to control erosion and associated sedimentation of the creek. Measures such as use of sediment control mesh and covering of stockpiles are among possible BMP's that would be employed to protect the creek. A Storm Water Pollution Prevention Plan (SWPP) will be prepared by the USACOE or the Construction Contractor, which would include methods or conditions for erosion control occurring due to the project construction. This document would be available on the construction site.

R **MITIGATION MEASURES FOR FUTURE MAINTENANCE:**

- All routine maintenance shall be accomplished between August and mid-October.
- A pair of silt curtain fences shall be set across the low flow not more than 100 yards downstream of the work area; the fences shall be approximately 10 yards apart.
- R If storm events do not reduce conveyance more than 15% then the next maintenance cycle shall involve only mowing of vegetation.

R • During those maintenance cycles when the County determines silt removal has become necessary, all plants and deposits would be removed. As the final step during maintenance, the pilot channel would be rebuilt following the path where a natural channel had gradually come into being, or where the pilot channel had been if hydraulic processes have not already shifted and reshaped it.

R • A swath half the channel wide shall then be mowed or brushed to suppress the growth of potentially large perennials, first along one side as seems convenient for an arbitrary distance (say, 250 feet), then switching to the opposite bank for another arbitrary distance. The pilot channel would not be disturbed.

R • If sediment removal is not needed the year after, then the other half of the channel would be mowed and brushed. The pilot channel would not be disturbed.

R • If storm events of the next winter rains leave enough sediments to warrant their removal, then during the following summer the full width of that section of the creek would be groomed to remove obstructing sediments and plants. The pilot channel would be rebuilt where a natural channel had gradually come into being, or where the pilot channel had been if hydraulic processes have not already shifted and reshaped it.

1. No discharge of oil or spill of contaminated material should be allowed within the creekbed (conditions identified above would be followed during the future maintenance.

2. BMPs will be employed to avoid excessive impacts to water quality.

7.7 RESIDUAL IMPACTS:

Project impacts on water quality due to both construction and future sediment removal are anticipated to be adverse, but short-term and localized. With utilization of the mitigation measures outlined above to reduce turbidity and avoid spills, impacts are expected to be less than significant.

SECTION - 8 - AIR QUALITY

8.1 EXISTING AIR QUALITY:

The State of California has established ambient air quality standards to protect human health. The federal government has also established health-based standards ("primary" standards), which are generally less protective of public health than state standards. In addition, the federal government has established "secondary" standards to protect public welfare. State and federal standards have been established for ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, suspended particulate matter 10 micrometers or less in size (PM_{10}), and lead. On July 18, 1997, a new federal standard was promulgated for ozone (8-hour) and suspended particulate matter 2.5 micrometers or less in size ($PM_{2.5}$). California has additional standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility reducing particles. All applicable standards are shown in Table 8.1.1. Monitoring of ambient air pollutant concentrations is conducted by the California Air Resources Board (ARB), the Santa Barbara County Air Pollution Control District (APCD), and industry.

The area affected by project emission sources would generally include the City of Santa Barbara. On December 10, 1997, the U.S. Environmental Protection Agency (EPA) reclassified the Santa Barbara County one-hour ozone non-attainment area from "moderate" to "serious." That action precipitated the requirement to establish a Photochemical Assessment Monitoring Station (PAMS) program. Of the three different types of PAMS sites, the APCD will initially be required to install a Type II site on the south coast of Santa Barbara County. The objective of a Type II site is to monitor for maximum ozone precursor emissions.

Ozone is a secondary pollutant formed in the atmosphere by photochemical reactions of previously emitted pollutants called precursors. Ozone precursors are mainly reactive organic gases (ROGs) in the form of hydrocarbons, and nitrogen oxides (NO_x). ROGs are gaseous forms of reactive organic compounds (ROCs) and do not include methane or other non-reactive methane and ethane derivatives. NO_x is the designation given to the group of oxygenated nitrogen species, with nitric oxide (NO) and NO_2 being the most commonly occurring compounds in the atmosphere.

The region of influence for ozone (0_3) may extend much farther downwind than for inert pollutants. In the presence of solar radiation, the maximum effect of precursor emissions on ozone levels usually occurs several hours after they are emitted and, therefore, many miles from the source. Ozone and its precursors transported from other regions can also combine with local emissions to produce high local ozone concentration. Therefore, depending on the meteorological conditions, the region of influence for O_3 could include much of Santa Barbara County.

Table 8.1-1
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	*Averaging Time*	*California Standards*[a,c]	---------NATIONAL STANDARDS[b]---------	
			Primary [c,d]	*Secondary*[c,e]
Oxidant (ozone)	1-hour	0.09 ppm (ug/m^3)	0.12 ppm (235 ug/m^3)	Same as primary
Carbon Monoxide	8-hour 1-hour	9.0 ppm (10 mg/m^3) 20 ppm 23 mg/m^3)	9 ppm (10 mg/m^3) 35 ppm (40 mg/m^3)	--- ---
Nitrogen dioxide (NO_2)	Annual 1-hour	--- 25 ppm (470 ug/m^3)	0.30 ppm (100 ug/m^3) —	Same as primary ---
Sulfur dioxide	Annual 24-hour 3-hour 1-hour	--- 0.04 ppm (105 ug/m^3) — 0.25 ppm (655 ug/m^3)	0.03 ppm (80 ug/m^3) 0.14 ppm (365 ug/m^3) — —	--- --- 0.5 ppm (1,300 ug/m^3) —
PM_{10}	Annual 24-hour	30 ug/m^3[f] 50 ug/m^3	50ug/m^3[g] 150 ug/m^3	--- Same as primary
Sulfates	24-hour	25 ug/m^3	---	---
Lead	30-day Quarterly	1.5 ug/m^3 —	--- 1.5 ug/m^3	-- Same as primary
Hydrogen sulfide	1-hour	0.03 ppm (42 ug/m3)	---	---
Vinyl chloride	24-hour	0.010 ppm (26 ug/m3)	---	---
Visibility reducing particles[h]	8-hour (10 A.M. to 6 P.M. PST)	In sufficient amount to produce an extinction coefficient of 0.23 per kilometer due to particles when the relative humidity is less than 70 percent.	---	---

Source: California Air Resources Board 1999. *California Air Quality Data, Summary of 1994 Air Quality Data for Gaseous and Particulate Pollutants.* Annual Summary, Vol. XXVI, Technical Support Division.
Notes: See Page 8-3

Notes:
a. California standards for ozone, carbon monoxide, sulfur dioxide (1 hour and 24-hour), nitrogen dioxide, suspended particulate matter (PM10), and visibility reducing particles, are values that are not to be exceeded. The standards for sulfates, lead, hydrogen sulfide, and vinyl chloride standards are not to be equaled or exceeded.
b. National standards, other than ozone and those based on annual averages or annual arithmetic means, are not to be exceeded more than once a year. The ozone standard is attained then the expected number of days per calendar year with maximum hourly average concentrations above the standard is equal to or less than one.
c. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based on a reference temperature of 20°C and a reference pressure of 760 mm of mercury (1,013.2 millibars). All measurements of air quality are to be corrected to a reference pressure of 760 mm of mercury; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health. Each state must attain the primary standards no later than 3 years after the Environmental Protection Agency approves that state's implementation plan.
e. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant. Each state must attain the secondary standards within a "reasonable time" after the EPA approves the implementation plan.
f. Measured as a geometric mean.
g. Measured as an arithmetic mean.
h. This standard is intended to limit the frequency and severity of visibility impairment due to regional haze and is equivalent to a 10-mile nominal visual range when relative humidity is less than 70 percent.

8.1.1 Santa Barbara County Air Pollution Control District Annual Air Quality Report (1996):

The state and federal governments have established ambient air quality standards for several pollutants. These standards, based on scientific and medical research, tell APCD how much of each pollutant can be in the air without causing harm. The APCD is required to monitor air pollution levels to ensure that air quality standards are met and, if they aren't, to develop a strategy to reduce air pollution so they can be met.

Santa Barbara County's air quality has historically violated both the state and federal standard for two air pollutants: ozone and particulate matter. The air does not meet the state and federal health-based standards for ground-level ozone, and does not meet state standards for particulate matter.

Santa Barbara County's air quality is improving, as measured ozone concentrations continue to decline. In 1997, for example, the monitoring stations recorded only 10 exceedances of the more stringent state ozone standard and only one exceedance of the federal ozone standard. This represented the cleanest year on record. During 1998, Santa Barbara experienced 15 exceedances of the state 1-hour ozone standard and two exceedances of the federal 1-hour ozone standard. The state and federal ozone standard exceedances from 1988 through 1997.

The 1998 Clean Air Plan (1998 CAP) was prepared by APCD to satisfy various mandates of the 1990 federal Clean Air Act Amendments (FCAAA) and the California Clean Air Act of 1988. Section 182(c) of the FCAAA requires all "serious" non-attainment areas to prepare a plan to reduce ozone forming pollution, and provide a demonstration that the control strategy proposed in the plan will result in the attainment of the federal 1-hour ozone standard by 1999. The latest state and Federal Clean Air Act requirements that apply to Santa Barbara County are provided below:

Section 182(c)(2)(A) Attainment Demonstration – This 1998 CAP must demonstrate attainment of the federal 1-hour ozone standard by November 15, 1999, based on photochemical grid modeling. Section 172(c)(1) also requires attainment of the standard, but does not specify the model to be used for the demonstration.

Section 182(c)(2)(B) Post-1996 Rate of Progress – The APCD must submit a plan to the U.S. EPA by January 9, 1999, that provides for at least a 9 percent reduction in VOC emissions from 1996 through 1999. This is in addition to the 15 percent reduction required by 1996 under Section 182(b)(1) for a total reduction of 24 percent by November 15, 1999. Overall, the Plan demonstrates that Santa Barbara will attain the federal 1-hour ozone standard by 1999.

In light of new public health data, the U.S. EPA has issued new federal standards for ozone and particulate matter. The new federal ozone standard will be based on an 8-hour averaging time; it will replace the 1-hour ozone standard once it is attained. Attainment and non-attainment designations for the 8-hour ozone standard are expected by July 2000. The U.S. EPA also established a new fine particulate standard ($PM_{2.5}$) for both short-term (24 hour) and long-term (annual) averaging periods, as well as changing the form of the existing PM_{10} standard. Attainment and non-attainment designations for the new fine particulate standards are expected between 2002 and 2005.

8.1.2 Historical Air Quality:

Air quality monitoring in Santa Barbara County began in the mid 1970's when State and Local Air Monitoring Stations (SLAMS) were installed in the most populated areas of the county. The SLAMS monitors are located to provide local and regional air quality information. Between 1986 and 1988, in preparation for major oil and gas facility construction and operation, Prevention of Significant Deterioration (PSD) stations were added to monitor facility-specific and regional air quality. PSD stations are required by the APCD to ensure that new and modified sources under APCD permit do not interfere with the county's ability to attain and maintain air quality standards. In general, 1986 is the start date APCD uses to evaluate the overall air quality trends in Santa Barbara County.

On December 10, 1997, the U.S. EPA reclassified the Santa Barbara County one-hour ozone non-attainment area from "moderate" to "serious." That action precipitated the requirement to establish a Photochemical Assessment Monitoring Station (PAMS) program. This program involves collecting low-level (3,500 feet) upper-air meteorological measurements utilizing an upper-air radar wind profiler, ten meter wind speed and direction, atmospheric temperature, relative humidity, total solar and sky radiation, barometric pressure, carbonyl sampling, speciated hydrocarbon sampling (72 compounds), and oxides of nitrogen and ozone measurements.

In addition to the APCD's PAMS program, the ARB will be conducting $PM_{2.5}$ monitoring at their downtown Santa Barbara and Santa Maria sites beginning in 1999. A third sampler is to be installed and operated near the San Rafael Wilderness by the federal land manager in the year 2000.

Inhalable particulate matter (PM_{10}) is source specific, wind dependent, and sampled only once every sixth day. For these reasons, it is not as good an indicator of overall air quality as ozone. However, it also shows an improving trend. The number of exceedances of the state PM_{10} standard has declined from a high of 17 in 1989 to only 9 in 1993, 1994 and 1995. In 1986 and 1987, the PM_{10} monitoring network was incomplete.

The state (1-hour) and federal (1-hour and 8-hour) ozone standard exceedances measured in the county from 1988 through 1997 for all monitoring stations in continuous operation during the last 10 years. Both federal and state ozone standards have been exceeded in recent years. In fact, the entire South Central Coast Air Basin encompassing San Luis Obispo, Santa Barbara, and Ventura Counties has been designated non-attainment for the state ozone standard. Santa Barbara County experiences between 10 and 42 days per year on which the state ozone standard is exceeded and 1 to 9 days per year on which the federal 1-hour standard is exceeded.

In addition to the federal 1-hour ozone standard, the U.S. EPA has promulgated (July 18, 1997) a new 8-hour ozone standard (0.08 ppm) that is generally more protective of public health. Compliance with the new standard is judged by taking the average of the 4th highest 8-hour concentration, each year, for a 3 year period. Transition to the new 8-hour ozone standard will occur over the next few years. Areas must first achieve the 1-hour ozone standard before that standard is officially revoked and replaced by the new 8-hour ozone standard.

The California 24-hour PM_{10} standard (50 micrograms per cubic meter or ug/m3) has been measured consistently at both SLAMS and PSD stations since 1986. The maximum 24-hour average concentration measured each year and the annual geometric mean for the Santa Barbara and Santa Maria SLAMS sites. Both the state 24-hour and annual PM_{10} standards are violated in the county. However, the county is in compliance with the federal 24-hour PM_{10} standard.

On July 18, 1997, EPA revised the primary and secondary air quality standards for particulate matter by establishing annual and 24-hour $PM_{2.5}$ standards and revising the form of the existing 24-hour PM_{10} standard. The new standards for $PM_{2.5}$ are set at 65 ug/m3 for 24-hour and 15 ug/m3 for an annual average. Since $PM_{2.5}$ is not currently being monitored in Santa Barbara County (or throughout the nation), the first step in addressing the new standard is the establishment of a monitoring program. U.S. EPA will be designating attainment and non-attainment areas (action expected between 2002 and 2005) with State Implementation Plans due starting in the year 2005.

8.1.3 Federal Statutes and Regulations:

The CAA Amendments of 1990 (1990 CAA) revised the planning provisions for areas that do not meet the NAAQS. The 1990 CAA identifies new non-attainment classifications and compliance dates, specific emission reduction goals, a demonstration of reasonable further progress and attainment, and incorporates more stringent sanctions for failure to attain or meet interim milestones. The requirements and compliance dates for reaching attainment are based

upon the severity of non-attainment classifications. Since Santa Barbara County is a serious O_3 non-attainment area, the APCD is required to design a plan that will bring the region into attainment by November 15, 1999.

For the 1994 through 1996 period, 3 sites in South County were in violation of the federal 1-hour ozone standard prompting U.S. EPA to reclassify all of Santa Barbara County as a "serious" non-attainment area. While 1997 was the cleanest year on record, additional efforts are needed to continue progress toward the goal of providing clean air for the residents of Santa Barbara County by achieving attainment for all applicable state and federal ambient air quality standards.

8.1.4 State Regulations:

The California Clean Air Act (CCAA) was signed into law on September 30, 1988. Key requirements of the law that this Plan addresses are the Triennial Progress Report (H&SC Section 40924(b)) and the Triennial Plan Revision (H&SC Section 40925 (a)). Additionally, the Plan must provide an annual 5% emission reduction of ozone precursors, or, if this cannot be done, include every feasible measure as part of the emission control strategy.

Similar to the federal system, the CCAA requirements and compliance dates for reaching attainment are based upon the severity of non-attainment classifications. The CAP details how the current attainment planning process satisfies both Triennial Progress Report and Plan Revision requirements for the state O3 standard, as mandated by the CCAA.

8.1.5 Santa Barbara County Regulations:

APCD Rule 303 - Nuisance. This rule states that a person shall not discharge air contaminants from any source that causes injury, detriment, nuisance, or annoyance to any considerable number of persons or that endanger the comfort, repose, health, or safety of any such persons or their business or property. The APCD considers emissions of air pollution to be a significant nuisance if five or more complaints are received from different individuals/ households within 20 hours or 10 such complaints are received within 10 days.

Rule 702 - General Conformity. This rule adopts the federal conformity rule and includes requirements to enforce mitigation measures used to support a positive conformity determination.

8.2 CITY OF SANTA BARBARA AIR QUALITY GOAL:

The City Conservation Element Air Quality Goal is:

Maintain air quality above Federal and State ambient air quality standards.

8.3 CLIMATE:

The climate of the project area is Mediterranean, characterized by warm, dry summers and cooler, relatively damp winters. The major influence on the regional climate is the Eastern Pacific High, a strong persistent high-pressure area. Seasonal variations in the position and strength of this system are a key factor in producing weather changes in the area.

8.3.1 **Visibility**:

Ground-level fog limits visibility to less than one-quarter of a mile on an average of 20 days per year at the Airport (NOAA 1994). These conditions are most frequent during the fall and early winter months.

8.3.2 **Temperature**:

Due to the moderating effect of the Pacific Ocean and lower elevation, temperatures are less extreme along the coastal sections of the project area compared to more inland locations. Maximum temperatures during the summer months average in the 70s (degrees Fahrenheit) along the coast to the high 80s in the interior valleys. Minimum summer temperatures average in the 50s to low 60s over most of the project area. Maximum temperatures during the winter months average in the 60s. Minimum winter temperatures are usually in the 30s and 40s in the project area.

8.3.3 **Wind Speed And Direction**:

The prevailing wind flow along the coast of Central California is from the northwest. However, due to the blocking effect of the Santa Ynez Mountains and deflection of these winds around Point Conception, daytime sea breezes are usually from the southeast to southwest along the southern Santa Barbara County coast. Light northeasterly land breezes usually occur at night. These land breezes may extend many miles offshore during the colder months of the year until daytime heating reverses the flow back onshore. High pollutant impacts can occur during these conditions, when pollutants transported offshore at night combine with local emissions onshore the following morning with the onset of the sea breeze.

Another situation that can lead to high pollutant concentrations in the project area results from the buildup of high pressure in the Great Basin and is known as a "Santa Ana" condition. This condition can produce strong northeast winds in Southern California, but, in general, light southerly winds occur in the project area. Santa Ana conditions frequently transport pollutant-laden air from the Los Angeles urban area to Santa Barbara County. Since stagnant atmospheric conditions often occur in Santa Barbara County during a Santa Ana, local emissions combined with pollutants transported from Los Angeles can lead to significant O_3 impacts in the region.

8.3.4 **Precipitation**:

Over 90 percent of the total annual precipitation in the project area occurs from November through April. Annual precipitation is approximately 18 inches at the coast and increases to 30+ inches in the Santa Ynez Mountains.

Although the overwhelming majority of precipitation in the project area is produced by winter storm systems from the north Pacific, summer tropical moisture can also produce clouds and rainfall. However, precipitation from tropical air masses is rare and usually occurs only from July through September.

8.4 IMPACTS ON AIR QUALITY:

Long-term air quality impacts in the Lower Mission Creek project site area would not be more significant than the current pollution emissions. The proposed short-term project construction will take place over two years and only utilize 189 days each year. Although quantitative thresholds of significance are not currently in place for short-term emissions in Santa Barbara, daily air quality impact thresholds were based on construction exhaust and fugitive emissions from the South Coast Air Basin (SCAB) and Coachella Valley area. If emissions on an individual day exceed 75 lbs. a day for ROC, 100 lbs. a day for NOx, 550 lbs. a day for CO, or 150 lbs. a day for PM10, the project impacts would be considered significant. Also, APCD requires that the construction emissions not exceed 25 tons per year. Based on summary Table 8-4.6-1 in Section 8.4.4, the proposed project will not induce any short-term significant impacts and, therefore, conforms with the Federal Clean Air Act as amended 1990 and the 1998 Clean Air Plan for Santa Barbara County Air Pollution Control District.

8.4.1 No Action Alternative No. 1 (Without Project Conditions):

Under the No Action Alternative, maintenance activity would be similar to the past maintenance performed by the Santa Barbara County. In the past, maintenance has been performed after major storm events to provide flood protection to the City of Santa Barbara. On average, maintenance has occurred at intervals of 2 to 3 years. Santa Barbara County has performed maintenance of the creek to protect the surrounding residential and commercial areas from temporary flooding. The quantity of material removed for each clean out has been dependent on the storm season, but has amounted to approximately 40 to 80 cy of material per day. The material has been transported to a disposal site, taking 4 to 8 truck trips (20 cy per truck load). Sometimes, the selected contractor has provided material to Caltrans or other construction facilities. However, material has been distributed within about a 10-mile radius of the project site. Debris removal operation has taken about 10 to 15 days per season. Emissions generated by these activities have been negligible; therefore, they have not contributed any adverse impacts to the air quality.

8.4.2 Alternatives 12, 6 and 8:

Three alternatives were identified as possible solutions to reduce flooding problems in the Lower Mission Creek Area. All are very similar in nature, but have different capacities and alignments. Alternative 12, the recommended solution, was chosen as the alternative upon which to base emission calculations. Emissions calculations would be very similar for Alternatives 6 and 8.

Alternative 12 would create short-term emissions. Project-related activities that would contribute to emissions include: removal of existing banks; channel excavation; and transporting material from the creek bed to the staging area. These impacts on air quality, however, are not expected to exceed air pollutant threshold values and should be temporary (189 days per year for up to four years). Emission calculations in Appendix G show that all parameters either meet or are lower than threshold limits.

R The total amount of material to be excavated from creek banks and creek bottom would be about 82,000 cubic yards (cy). Creek excavation would occur section by section. Therefore,

all 82,000 cy of material would not be stockpiled at one time. About 17,000 to 18,000 cy of material would be utilized in project construction as fill material. The remaining 64,000 cy of excavated material can be stockpiled or be taken to a county yard for storage or recycling depending on whether it meets project specifications. The material could be distributed to other construction sites requiring fill. It is assumed that a very small amount of excess material would be transported within a radius of about 10 to 25 miles from the project site. A maximum of about 30,000 to 40,000 cy of material would need to be transported to disposal sites, either at the Tajiguas Landfill, located 25 miles west of the project site, or used in a reclamation site (if one exists at the time of construction). About 1,500 to 2,000 truck trips would be required to transport the excavated material. Channel excavation may last for about 130 to 180 days; however, excavation and construction activities, including bank stabilization and construction of bridges etc., would be accomplished at the same time. The construction would be performed in segments. The estimated time frame for project construction is about two years. It is assumed that about 10 to 15 truck trips would be required per day to transport excavated material to the staging or stockpile area or disposal sites.

During excavation some of the material would be used as a fill material and the remainder would be disposed at a disposal site. The material would be transported from the creek bed to the staging area located along the creek banks. This distance is about ¼ mile from the project site. To further minimize impacts on air quality, mitigation measures would be implemented. These would include watering unpaved roads, limiting truck speeds to 15 miles per hour on unpaved roads, watering the construction site as well as stockpiled material, ceasing construction during high wind velocity and covering stockpiled material and material transported in haul trucks.

8.4.3 **Future Sediment Removal**:

After project construction is completed, maintenance of the creek would be required to maintain channel capacity. Future maintenance of the channel would be similar to the past maintenance or debris removal operation. In the past, Santa Barbara County removed material from the project reach area on an average of about two to three every years. The change from existing conditions to design conveyance capacity would alter the net sediment budget for the entire project very slightly. A net total of 25 yd^3 should accumulate each time the creek carries an average storm event. In contrast, individual higher peak flows should promote net erosion from the streambed, 35 yd^3 during a 5-year storm event and roughly ten times that quantity removed during a single design event. Future sediment accumulation is dependent upon the size and number of storm events. However, future maintenance would be similar to the existing maintenance performed by Santa Barbara County. As an example of maintenance activities, the last time the County removed sediments about 350 cy^3 between Canon Perdido Street and Highway 101 in the summer of 1997.

Future debris removal would increase fugitive dust due to excavation of the material. About 4 to 8 truck trips per day would be required to transport the sediment to a disposal site or material could be distributed to construction sites needing the material. However, these impacts would be similar to without project conditions. They would be temporary and conditions would be stabilized after maintenance is completed.

R

8.4.4 Summary of Air Quality Analysis:

Evaluating the air quality impacts associated with the proposed Lower Mission Creek Flood Control Improvement Project is separated into two separate analyses. First, are the temporary, short-term emissions generated during project construction, which include exhaust emissions from heavy equipment operation associated with grading, and excavation activities, and personnel and trucks commuting back and forth to the proposed site. Second, are the fugitive emissions generated by the bulldozer operation and trucks traveling on paved and unpaved roads. Each of these analyses are performed separately and then combined to arrive at total emission estimates related to both operations. The quantity of material was based on total excavated material of 82,000 cubic yards. The construction would occur reach by reach; therefore, all excavated material would not be stockpiled or transported at one time. About 17,000 to 18,000 cy of material would be used as a fill for the construction of the project. Some of the material would be recycled, therefore, most likely about 30,000 to 40,000 cy of material would need to be transported to a disposal site or construction sites located in the vicinity of the project area. However, the air quality analysis is performed for 64,000 cy of material to be transported to the disposal sites or construction sites, in case sites are not available in the immediate project vicinity.

Estimation of air quality impacts was performed under the guidance of the South Coast Air Quality Management District (SCAQMD), using methods prescribed in the 1993 California Environmental Quality Act (CEQA) Air Quality Handbook published by the SCAQMD. Although quantitative thresholds of significance are not currently in place for short-term emissions in Santa Barbara, CEQA requires that short-term impacts be discussed in the environmental document. Emission factors were obtained from the 1993 CEQA Air Quality Handbook (SCAQMD) using Tables A9-8-A,B,C,&D; A9-5-K-5; and A9-9-B, C, D, and F. These calculations were based on worse case scenarios using transportation of about 64,000 cy of material. Project related air quality calculations are located in Appendix G.

A summary of emissions generated due to project construction is presented in Table 8.4.6 -1. Particulate matter generated by the construction activities would be about 100 pounds per day; this increase is below the daily thresholds levels. Mitigation measures identified in Section 8.4.6 would be implemented to minimize release of fugitive dust. Project-related emissions would contribute minor quantities of Carbon Monoxide (CO), Reactive Organic Compounds (ROC) and Oxides of Nitrogen (NOx) and other pollutants to the air. Construction and future sediment removal related emissions are short term, and conditions will stabilize after completion of the project. Emissions generated by the future sediment removal would be negligible, and would be insignificant. The impacts would be short-term, temporary, and adverse, but not significant.

8.4.5 Requirements of Determination of Conformity:

The Clean Air Act (CAA), 40 CFR Part 93.153 states that a conformity determination is required for each pollutant where the total of direct and indirect emissions in a non-attainment or maintenance area caused by a Federal action would exceed the *de minimis* Federal standards established in 40 CFR 93.153.

A conformity determination regarding the Corps' Federal action of constructing the Santa Paula Creek Flood Control Project would only be mandated if the direct and indirect emissions from construction and or maintenance exceeds twenty five tons per year, for either NOx or ROC (See 40 CFR 93.153). As per the calculations and Tables # G-1 through G-6, Appendix G, the CO, ROC, NOx, SOx and fugitive dusts emissions fall well below these *de minimus* levels as prescribed in 40 CFR 93.153(b). Therefore, this proposed project conforms to the Federal Clean Air Act as amended in 1990 and, as required, a Record of Non-Applicability has been prepared instead of a conformity determination (Appendix G).

Summary of Air Quality Analysis
Total Project Emissions
Table 8.4.6-1

Source	PM-10	CO	ROC	NOx	SOx	Pb
Exhaust	9	25.99	4.33	45.47	3.88	-------
Fugitives	101.45					
Daily Totals (lbs./day)	104	25.99	4.33	45.47	3.88	
Daily Thresholds (lbs./day)	150	550	75	100	150	
Number of constructio n days per two years	378	378	378	378	378	
Total Project (lbs./yr.)	19,814.76	4,912.1 1	818.37	8,593.83	733.32	
Total Project (tons/yr.)	9.90	2.46	0.41	4.30	0.37	
Annual Threshold (tons/yr.)	25	25	25	25	25	
Significance	No	No	No	No	No	

8.5 MITIGATION MEASURES:

- The selected contractor shall water the excavation site, storage piles and unpaved roads twice each day of construction; once in the morning and at the end of the construction day; this mitigation is applicable for both construction and future maintenance.
- Transported material shall be covered to reduce fugitive dust.
- Limit vehicle speeds to 15 mph maximum within the construction site and maintenance areas (construction and future maintenance), and cease grading and earth movement when wind speeds exceed 15 mph, or as confirmed by SBCAPCD during construction and future maintenance activities.
- The selected contractor shall cover the storage piles to minimize fugitive dust.

8.6 RESIDUAL IMPACTS:

Residual air quality impacts would be less than significant and would be further reduced with the inclusion of the mitigation measures recommended above.

SECTION - 9 - NOISE

9.1 EXISTING NOISE:

Noise can be defined as unwanted sound or sound in the wrong place at the wrong time. Noise also can be defined as any sound that is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. The definition of noise as unwanted sound implies that it has an adverse effect on human beings and their environment. Noise also disturbs natural wildlife and ecological systems (Environmental Impact Assessment, USACOE, Training Class, Larry W. Canter, 1989). The sound pressure level has become the most common descriptor used to characterize the loudness of an ambient sound level. Sound is mechanical energy from a vibrating surface, transmitted by cycling a series of compressions and reaction of molecules in the materials through which it passes. Sound can be passed through gases, liquids and solids. The human ear does not respond linearly to increases in sound pressure. The nonlinear response is essentially logarithmic. Therefore, noise measurements are expressed by the term "sound pressure level (SPL), which is the logarithmic ratio of the sound pressure to a reference pressure and is expressed as a dimensionless unit of power, the decibel (dB). The dB scale is used to quantify sound intensity. To obtain a single number representing a sound level containing a wide range of frequencies and yet representative of the human response, it is necessary to weight the low and high frequencies with respect to medium frequencies. The resultant SPL is "A weighted," and the units are dBA. The A-weighted sound level is also called the noise level. Noise may be generated from a point source, such as a piece of construction equipment, or from a line source, such as a road containing moving vehicles. Typically, noise decreases with distance. The source of noise can vary from an occasional aircraft overflight to continuous noise from traffic on an adjacent street. The SPL dBA for various types of activities measured in the environment and subjective human response to various intensities of noise, are represented in Table 9.1-1.

There are no federal, state or local noise standards that directly regulate environmental noise from construction or project operation. Federal regulations safeguard the hearing of workers exposed to occupational noise, enforced by the Office of Safety and Health Administration (OSHA). The U.S. Environmental Protection Agency (USEPA) has developed guidelines on the recommended maximum noise levels to protect public health and welfare (USEPA, 1974). For example, 55 dBA is the maximum for the annual average day-night level in outdoor areas (USEPA, 1978).

TABLE 9.1-1

SPL, Sound Pressure, and Recognized Source of Noise in Our Daily Experiences

Sound Pressure, μbar	SPL, dBA	Example
0.0002	0	Threshold of hearing
0.00063	10	NA
0.0002	20	Studio for sound pictures
0.0063	30	Studio for speech broadcasting
0.02	40	Very quiet room
0.063	50	Residence
0.2	60	Conventional Speech
0.63	70	Street Traffic at 100 ft
1	74	Passing automobile at 20 ft
2	80	Light trucks at 20 ft
6.3	90	Subway at 20 ft
63	110	Loud motorcycle at 20 ft
200	120	Peak level from rock and roll band
2000	140	Jet plane on the ground at 20 ft

Source: Environmental Impact Assessment, Dr. Larry W. Canter, University of Oklahoma, USACOE, Training, 1989.

9.1.2 **Noise Levels Within the Project Area**:

The regional sources of noise in this part of Santa Barbara include truck and automobile traffic along U.S. Highway 101, Union Pacific Railroad and local surface streets. As described in the Land Use Section of this report, the proposed project area is located in the vicinity of the downtown and waterfront and major land uses consist of residential, commercial and industrial uses. Current sources of noise in the project area include automobile and truck traffic along local streets and U.S. Highway 101, and railroad traffic. The City of Santa Barbara monitors noise levels within the city. Ambient noise levels within the Study Area have been identified based on the noise contour map prepared by Illingworth & Rodkin, Inc (1997), for the City of Santa Barbara. Ambient noise levels within the project area range from 60 to 70 dBA. The flow of automobiles was observed on the local street during the site survey. The lowest noise level recorded along local streets is 60 dBA, which is high compared to the normal noise levels experienced within a more suburban residential area. Noise levels generally increase approaching the ocean, because traffic volumes and tourist activities are higher closer to the coast. In addition, the Union Pacific Railroad mainline and U.S. Highway 101 are close to the coast.

9.2 CITY OF SANTA BARBARA GENERAL PLAN GOALS AND POLICIES FOR NOISE:

The Noise Element focuses on the noise environment in the City. It points out the problem areas and sets goals for maintaining and enhancing good noise conditions and improving areas with noise problems. The goal of the Noise Element is "to ensure that the City of Santa Barbara is free from excessive noise and abusive sounds." Policy 6.0 of the Noise Element points out that "noise control activities should be coordinated with those of other responsible jurisdictions." The City, County and USACOE will incorporate mitigation measures to reduce noise generated during project construction and future maintenance to meet the requirements of the City Noise Ordinance.

9.3 NOISE IMPACTS:

Noise related impacts would be considered significant if the noise level is excessive and produces an abusive sound. Long term noise should not exceed 60 dBA in residential areas, and 75 dBA near hotel or commercial areas. The City has no short-term noise impact thresholds. However, construction is not allowed between 7:00 p.m. and 7:00 a.m.

9.3.1 No Action Alternative No. 1 (Without Project Conditions):

Santa Barbara County has performed routine maintenance of Lower Mission Creek periodically in the past. This sediment removal activity has also occurred in the past after major storm events. During past maintenance activities, noise levels increased due to the use of construction equipment and trucks transporting materials. These impacts were localized and short-term. Reduction of project related noise impacts will be coordinated with the appropriate local agencies.

9.3.2 Alternatives 12, 6 and 8:

Construction equipment would elevate noise within the project area. Heavy construction equipment produces noise levels ranging from 80 to 89 dBA, as measured at a distance of 50 feet (79 dBA at 100 feet). Project construction would take about two years, i.e.; it would be constructed in two reaches. Within any one block, the construction related noise impacts could last about two to three weeks. This impact would be short-term. Residential areas would experience elevated noise levels during construction and future maintenance. Existing average noise levels range from 60 dBA to 70 dBA. Automobiles passing along the local streets could generate noise levels from 70 to 74 dBA, and loud motorcycles could generate about 110 dBA at a distance of 20 feet (See Table 9.1-1 for noise levels generated by various activities). The noise levels would be elevated compared to existing noise levels due to the use of construction equipment in the vicinity of the project site. Increases in noise levels compared to existing noise level would be about 10 to 15 dBA. In addition, construction activities would not remain at one location. It is assumed that construction equipment would be at one location (within a 100-foot area) for about 2 to 5 days. Noise increases due to construction would be localized; impacts would be short-term, affecting only the immediate project vicinity and surface streets would be designated as haul routes. Conditions would be stabilized after completion of the project construction or future maintenance.

The USACOE staff will coordinate with the City of Santa Barbara for noise ordinance compliance. Use of heavy equipment and truck traffic would follow the City of Santa Barbara noise ordinance regulations. To minimize noise impacts during early morning and late evening, operation of heavy equipment (bulldozers, excavators crushers) would be limited to the hours between 8:00 a.m. and 5 p.m., Monday through Saturday. Truck transportation would be permitted between 7:00 a.m. and 7:00 p.m. No construction activity would occur on Sundays and holidays.

9.4 MITIGATION MEASURES:

- Operation of heavy equipment shall be limited to the hours between 8:00 a.m. and
- 5:00 p.m., Monday through Saturday. Truck transportation shall be permitted between 7:00 a.m. and 7:00 p.m., Monday through Saturday. No operation of heavy equipment or truck transportation shall occur on Sundays and holidays.
- Truck traffic shall be limited to designated truck routes, as determined in cooperation with City Transportation staff.
- The selected construction contractor shall follow the noise ordinance established by the City of Santa Barbara.
- Property owners and tenants within the project area shall be notified prior to project construction in their area.

9.5 RESIDUAL IMPACTS:

With the implementation of the above mitigation measures, the project would have short-term impacts within the construction zone, which are not considered to be significant. The conditions would be normal after completion of the project. There will be no long-term noise impacts as a result of the construction of the flood control project.

SECTION - 10 - BIOLOGICAL RESOURCES

10.1 THE PHYSICAL SETTING OF BIOLOGICAL RESOURCES ALONG THE CREEK:

10.1.1 An Overview:

This compilation of existing biological and habitat conditions relies on assorted documents available to the public, published papers of academic origin available through university libraries, a Draft Coordination Act Report prepared by the US Fish and Wildlife Service (USFWS), a Biological Opinion about potential effects of the recommended Alternative on steelhead prepared by the National Marine Fisheries Service (NMFS), conversations with persons knowledgeable about particular topics or subjects along Mission Creek, and site visits by the Corps of Engineers in September and December of 1997, January 1999, and May 1999. However, it is not intended to present a complete and thorough encyclopedic list of the plants and animals which may be found if one looks hard enough. Instead, only the important and representative species are noted. Fiscal limitations constrain this report from spending funds for a repetition of biological surveys, especially when prospects would doubtfully yield significant new information about species and their ecological roles in the limited geographic area along lower Mission Creek, where this proposed flood control project would be implemented.

Previous planning efforts for flood control along the lower part of Mission Creek led to numerous ecological surveys of specific segments of Mission Creek within the urban region. Historically, these emphasized species of reptiles and amphibians, birds, mammals, and vascular plants. Fish, nearly all invertebrates except those few which elicited casual mention in written reports, non-vascular plants, and the animal-like and plant-like single celled organisms which populate fresh water habitats have never been examined systematically. A comprehensive summary of biota identified in the lower and upper reaches of Mission Creek includes 26 species of amphibians and reptiles combined, 108 bird species, 37 mammalian species, and 222 species of vascular plants (Corps of Engineers, 1995). For the most part, these types of organisms include only the limited suite of plant and wildlife species comfortable in close proximity to human modifications to the natural world.

This evaluation of existing biological circumstances encompasses the stream banks and the creek between the intersection of Canon Perdido and Castillo Streets and Cabrillo Boulevard. The ecological effects of future maintenance expectations have been restricted to this same boundary as well.

10.1.2 Transformation from Riparian to Existing Urban Biotic Conditions:

Mission Creek has unquestionably experienced much change to its biotic character in the last two hundred years, but in the absence of concise descriptions from the era prior to settlement by Europeans this characterization has to be drawn from ecological generalizations about streams

of the coastal plains and their environs in southern California. Overall, the lay of the land gives Mission Creek a roundabout course between its watershed in the Santa Ynez Mountains to the north and the Pacific Ocean: heading south at first, then turning through a broad arc from a westerly direction through south again and eventually following a southeasterly direction to its mouth at the coast. Most of its length, below the narrow place now called Rocky Nook, would likely have been characterized as riparian woodland (*sensu latu*; Bowler, 1989). Close to the ocean, the creek almost certainly spread out into a braided, estuarine wetland.

Mission Creek provided the steady water source which enabled Franciscans to found the historic Mission Santa Barbara (a protracted beginning between 1787 and 1820), then sustain the agrarian community following the European economic pattern which developed in the immediate region surrounding the Mission. Pastoral agriculture associated with the Mission surely prompted the first large influences on the biotic communities native to the lower end of Mission Creek, between 1820 and 1890. An increasingly urban emphasis after that has had a predictable outcome: the immediate and greatest effects come from commercial and residential development within the City of Santa Barbara, and the construction and maintenance of roads and bridges on which those very urban developments depend. What was once native riparian community and wetlands inevitably became rearranged to suit human purposes. Now, no portion of Mission Creek within the geographic area covered by this report lacks for man's influences on the stream's channel or its banks. These improvements closely line the actual stream course and often have completely removed any remnant of the riparian environment which existed there before the coming of the Spanish.

After reaching the coastal plain, Lower Mission Creek undergoes a gradual transformation, from a narrow and incised fresh water stream to a narrow estuary. Most of its length below Castillo Street, slightly more than a mile, is riverine in character. A switch from fresh to brackish water typically begins at Yanonali Street and estuarine properties are well developed by the Mason Street Bridge. Daily tides, or at least a regular infiltration of salt water through a barrier which forms naturally at the creek's mouth during the summer months, give that final length a more pronounced estuarine character closer to the beach. After passing beneath Cabrillo Boulevard, Mission Creek essentially ends in a seasonal lagoon at the edge of Santa Barbara Harbor. This study does not extend to that lagoon, although incidental remarks about it will help round out the ecological characterization of the project, its potential impacts, and ameliorations of them.

Natural habitat in both the riverine and the estuarine sections of Mission Creek is strongly limited by all aspects of urban development: periodic clearance of vegetation and accumulated sediments from the channel, the indiscriminate use of the channel as a dumping ground for refuse, intermittent and private hard siding of its banks, housing on private property along both sides of the channel, bridges carrying roads over the channel, the convenience of discharging storm water lines into the channel (especially underneath bridges), and the concentration of business developments within or adjacent to residential neighborhoods.

Two species of fish, both Federally protected as endangered under the Endangered Species Act, make use of Mission Creek. The tidewater goby (*Eucyclogobius newberryi*) could be present from late spring through the fall months in the estuarine part of the creek. Gobies enter the creek from the coastal lagoon and forage as far upstream as the Yanonali Street Bridge. At that point, a man-made sill about 15 inches high spans the entire channel. Especially during the summer months when the creek often carries very little water, its minimal depth combined with other factors would appear to make it very difficult for gobies to cross above this sill and swim even as far upstream as lower end of the sandstone channel. The second species, steelhead (*Oncorhynchus mykiss*), uses the lower end of Mission Creek as a migratory channel in some years. When flow conditions permit, adults swim upstream to spawning sites in the upper reaches. Juvenile steelhead, called smolts in this stage of their life history, use Mission Creek through the project area only as a migratory corridor to the ocean. Lower Mission Creek does not afford spawning or rearing conditions for steelhead.

Isolated native trees of notable age and stature still occur at various locations along the creek. Very prominent western sycamores (*Platanus racemosa*) are well established and healthy at six widely separate places. A medium sized coast live oak (*Quercus agrifolia*) has grown on a low bank just above the streambed near one of the bridges. Elsewhere along the creek, a young cottonwood (*Populus fremontii*) struggles to survive against the effects of periodic channel maintenance, and a few mature willows (*Salix lasiolepis* and *S. laevigata*) and fewer still white alders (*Alnus rhombifolia*) have become established on the overbank.

The Moreton Bay Fig (*Ficus macrophylla*) for which Santa Barbara is renowned, grows east of Mission Creek and at an elevation about 7 feet higher than the channel.

R Hydrologically, Mission Creek should now be considered a seasonal watercourse in dry years. It was likely permanent before 1800, but removal of native vegetation throughout its watershed would have had potentially large effects. Man-made diversions considerably farther upstream also diminish its flow through this section. May through October are the driest months along this part of the coast, when total rainfall amounts to about 1.3 inches, on average. During the months from late summer through fall, little to no water drains from this watershed. The incidental trickle moving down the channel after mid-summer appears to arise primarily as urban runoff, entering Mission Creek via storm drains along its course. After the onset of winter rains it conveys runoff as surface flow to Santa Barbara Harbor.

10.1.3 **Existing Urban Conditions along Lower Mission Creek**:

A riverine biological community on the coastal plain of southern California without the dominating urban constraints which characterize Mission Creek would have two predominant features, the stream bed and the variable depths of water flowing along it, and the vegetation growing in structural layers along its banks. Both would influence each other, although stream bank features would ordinarily have a much stronger determining influence on such attributes as water temperature, the plants and animals in the stream, light conditions, nutrient availability to animals, and so forth than the stream would exert on the banks.

R Practically speaking however, urban influences in this lowest region of Mission Creek have disrupted those functional ecological processes and nearly all the actual physical links between stream banks and streambed, such as canopy trees growing from the edge of the streambed or just up on the bank and forming submerged root masses. Even so, Mission Creek continues to sustain impoverished habitat for plants and wildlife as discussed below. The urban reality of biological conditions here make a simplistic distinction between the stream's banks and the aquatic elements confined to the streambed of the creek an easier way to describe both the impacts and the ecological returns of design features of the proposed flood control project.

R 10.1.4 **Numerical Values Express Ecological Quality**:

Comparisons of long-term effects on biological resources become the chief way by which alternatives have been evaluated. This is termed a Habitat Evaluation Procedure (HEP). Reaching conclusions by a HEP will entail numerical descriptions of stream bank and aquatic habitats, in addition to their respective verbal characterizations. In essence, any changes in those numerical values indicate the nature of effects which may be ascribed to alternatives. Comparisons will primarily be drawn between Alternative 12, the proposed and recommended flood control design, and Alternative 1, the formal decision to implement No Action. Alternative 1 can be viewed as the expectation of future conditions in the absence of the proposed project.

Habitat worth for both alternatives will be expressed as Habitat Units, abbreviated HU. Higher values of HU correspond to an assessment of higher ecological value. The straightforward arithmetic of HEP leads to HU values, but requires a cumbersomely involved sequence of steps. Those steps are best presented elsewhere (Appendix C). HEP calculations are merely summarized by simple numbers throughout Chapter 10.

10.2 EXISTING BIOLOGICAL RESOURCES:

10.2.1 Aquatic Habitat:

R **Streambed of Lower Mission Creek**: As best Lower Mission Creek may be characterized, its aquatic habitat equates to ecological conditions prevailing below the ordinary high water mark. It retains its fresh water characteristics from the upper end of the project area (where Mission Creek emerges from beneath the bridge at Castillo and Canon Perdido Streets) down to Yanonali Street. Mission Creek is just barely a perennial stream however. Indeed, urban runoff alone may prevent the disappearance of surface water after late summer. Estuarine traits prevail from there down to the lower end of the project area (where the creek passes beneath the bridge at Cabrillo Boulevard), becoming saltier with the interchange of fresh and salt water closer to the harbor. Commercial and residential development which took place historically along this last section of creek now constrain it within a nearly artificial channel: no mudflats dissected by tidal creeks remain anywhere along the estuary. No tracheophyte plant species ecologically associated with functional coastal marine communities remain anywhere along Mission Creek.

This full span of the existing aquatic habitat within the project area measures about 5300 feet in length (measured along the center of the channel). Not all that full length of creek bottom would actually be reshaped as part of the recommended alternative, however. Approximately 18% of the stream's present water course would be left entirely unchanged. This portion of its aquatic habitat to be excluded from any disturbance spans the distance from the upstream side of Highway 101 to the downstream side of Yanonali Street, about 975 feet in length. Considering then the actual proportions of aquatic habitat which lie within the proposed construction footprint, upstream of the freeway (about 3150 feet long, roughly 59% of the existing streambed) Mission Creek carries fresh water, then a varying mix of fresh and salt water (shifting always with tidal influxes) downstream of Yanonali Street (a reach about 1170 feet long and 22% of the existing stream bed).

A sequence of man-made structures forms a substantial portion of the existing watercourse. This section probably follows the naturally incised channel although that is not now evident. Mission Creek first bends to the right just above Highway 101, creating a feature known locally as the oxbow. In very quick succession thereafter, the oxbow leads water beneath the freeway (a box culvert bridge 140 feet wide), through a 60 foot length lined by riprap and wing walls, beneath Montecito Street (also a box culvert bridge, 60 feet wide), through a 20 foot section lined again by wing walls, beneath the bridge which elevates the railroad tracks (a central pillar bridge 70 feet wide), and then bends back to the left at the upper end of the historic sandstone-lined channel. The sandstone channel has a concrete bottom and carries water as far (about 530 feet in length) as the bridge at Yanonali Street. The transition from fresh to brackish water effectively begins directly beneath the Yanonali bridge where a sill roughly 15 inches high spans the full width of the creek bed (entirely concrete at that point) and marks the upper limit of tidal influence, except perhaps during very severe winter storms.

Apart from the reach of bridges and sandstone channel just described, in both the fresh-water and the estuarine segments its aquatic properties have been influenced to a very great degree by individual property owner's decisions to armor streambanks on their property, the toe of those banks, and even the creek bed itself in many locations against erosion. Where concrete was placed below the ordinary high water mark, the result can be a solid projection into the low flow path of the creek in some places, a uniformly broad, flat surface (e.g. upstream of the Gutierrez Street Bridge), or concrete edges that confine the creek's low flow route to a narrow course. Estimates of the length of the streambed where only natural surfaces are evident — admitting the probable existence of some concrete now covered thoroughly by native sediments — were made by walking the creek. Natural sediments (silty muds and gravels) compose the streambed for about ⅔ of its length (roughly 3560 feet, not including that found between Highway 101 and Yanonali Street) within the project area (3560/5380 = 0.66), while evident hardened surfaces cover roughly ⅓ the length of the stream bed (1820/5380 = 0.33).

R **Periodic maintenance perpetuates existing conditions**: The County Flood Control presently cleans the fresh water portions of the creek as needed to remove accumulated sediments,

obstructive growth of plants, and accumulated debris. Sporadic accumulation which diminishes its conveyance capacity by more than 15% triggers that need for maintenance. That maintenance procedure has stripped the creek bed of most natural features that would have contributed to a heterogeneous stream channel.

When first examined on September 11, 1997, the bottom of the channel had very recently been cleaned of most vegetation and accumulated debris by the Santa Barbara County Flood Control and Water Conservation District. Indeed, it was bare and all but devoid of any features through most of its length from Canon Perdido Street to the south side of the Montecito Street Bridge. Reports of first-hand observations by several members of the Corps who saw the same places in late August contrasted starkly with the scoured conditions found in mid-September. Moreover, the differences evident between August and September of 1997 are indicative of the long-term existing conditions, a channel maintained as needed to keep water moving through the creek rather than encourage growth of native vegetation. Over a sequence of years, one would see a discernible pattern of cyclical changes, from bare creek bottom to the first stages of seral succession in a coastal stream, then back again to bare creek bottom. The streambed reflects this historic emphasis on periodic maintenance.

The preparations in late summer of 1997 for heavy rains possibly to come with El Niño emphasize the balance between the extent of channel maintenance required periodically to restore its conveyance capacity, which can have pronounced but temporary biological effects, and the inherent successional pattern of plants reestablishing themselves. Were it not for occasional cleaning of the streambed, herbaceous plants would take root and proliferate, then create the ecological circumstances which promote shrubby perennials followed by regrowth of trees adapted to this biological community.

Channel maintenance began at the intersection of Canon Perdido and Castillo Streets, the transition between the trapezoidal concrete channel built by CalTrans and the native soils which compose the channel bottom downstream from that point. Channel maintenance extended as far as the concrete underpass through which the creek flows beneath US 101.

The effects of channel cleaning were somewhat patchy. The maintenance had evidently removed from the bottom itself and the lowest edges of the banks substantial quantities of giant reed (*Arundo donax*), umbrella sedge (*Cyperus erogrostis*), castor bean (*Ricinis communis*), tree tobacco (*Nicotiana glauca*), and undoubtedly various other weedy species. Plants higher up, even a few inches above the flat channel bottom, were not damaged. In some areas, essentially the entire width of the bottom had been scraped bare of plants, yet elsewhere even delicate aquatic vegetation a few inches tall was virtually undisturbed. Where the scoop or blade had occasionally passed above them at various places along the channel, these small clusters of undamaged plants included yellow water evening primrose (*Ludwigia peploides*), cattails (*Typha* sp.), bulrushes (*Scirpus* sp.), and water smartweed (*Polygonum persicaria).*

Sixteen months later, January 1999, the streambed was less austere, probably due to rains in the 1998 El Niño season. Those notable rains had brought sediments from upstream and

currents had defined a definite channel along the streambed. Herbaceous vegetation had begun to grow in small islands.

By May 1999, considerable growth of herbaceous and also perennial stream-bottom plants was evident. Many plant species had become established after the last channel maintenance. The great majority of species were still herbaceous (the most common of them not already mentioned above including northern willowherb [*Epilobium adenocaulon*], water cress [*Rorippa nasturtium-aquaticum*], yellow sweet-clover [*Meliotus indicus*], black mustard [*Brassica nigra*], a coarse rye grass [*Lolium* sp.], rabbit's foot grass [*Polypogon monospeliensis*], sweet fennel [*Foeniculum vulgare*], smilo grass [*Piptatherum miliaceum*], and willow dock [*Rumex salicifolia*], but a few perennials had started as well (a blackberry [*Rubus ursinus*], white nightshade [*Solanum douglasii*], mulefat [*Baccharis salicifolia*], poison hemlock [*Conium maculatum*], sand-bar willow [*Salix exigua]* in a couple of places, and salt cedars [*Tamarix* sp.] growing in the sandstone channel). At several locations along the creek, seedling red willows (*Salix laevigata*) and western sycamores (*Platanus racemosa*) already had a good start.

In addition to growth of plants, by May 1999 the streambed had reacquired topographic variation, albeit on a modest scale. Rocky stretches and winding creek prevailed in some parts. Elsewhere the bottom was quite soft, oozy mud.

Riverine pools: Walking the creek bottom twice in May 1999, revealed notable changes to the streambed attributable to stream flow over the previous two rainy seasons. Where, in September 1997, it had been artificially smoothed and leveled, by late Spring of 1999 Mission Creek had carried enough water to scour deep pools in its bed. These formed most commonly where currents had undercut the concrete sills that form the toe of private bank stabilization techniques in several places, next most often at bridge abutments, and lastly in exposed rocky runs just above the freeway (Fig.10-1).

All extant pools, except the pair in the upper part of the oxbow, have formed where complex hydrological interactions between man-made structures and currents caused differential erosion and sediment deposition patterns. The rains of El Niño may have exacerbated these scouring patterns. A sizable hole in the streambed currently present at the upstream end of the Bath Street bridge exemplifies this relationship. At this spot, a wing wall protecting the right hand bank, together with the concrete bottom of the bridge and the vertical wall of the bridge itself, induced the formation of a hole estimated to be 5 feet deep, 15 feet wide, and 40 feet long. Moreover, a raised lip of soft sediments has formed immediately upstream of the hole. In

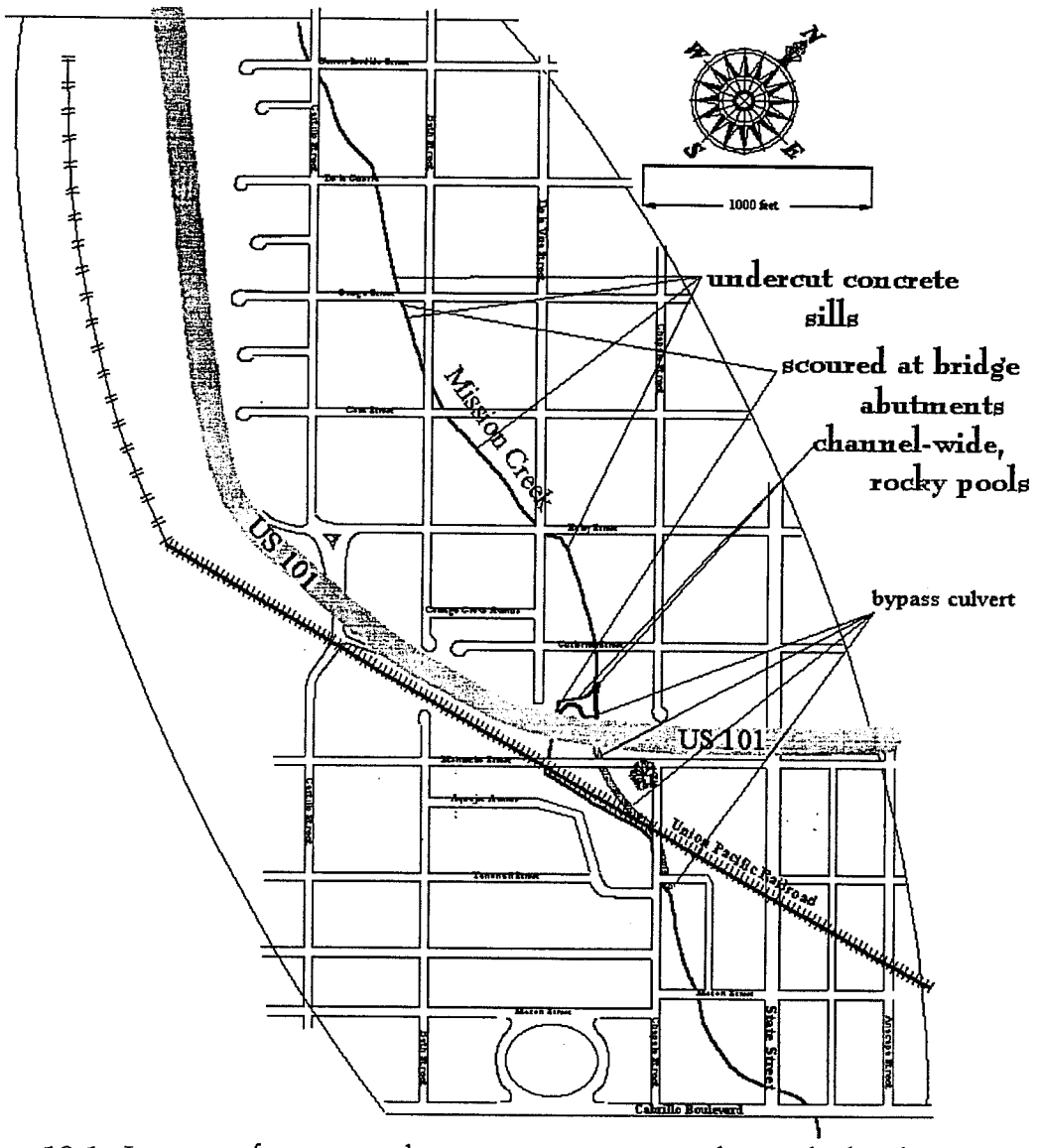


Fig. 10-1. Location of riverine pools extant in May, 1999. Those at bridge abutments were the largest and deepest.

essence, the upstream edge of the bridge caused the formation of this deep pool. In all likelihood, currents varying with the conditions of any given rainy season could equally well cause such pools to fill with sediments and disappear, given a steady season of low velocities down Mission Creek. In addition to being transient for that very reason, and they would also tend to change in size from one season to the next.

R The largest of these pools formed at the upstream abutments of bridges. Two such pools existed in May 1999, one at Bath Street and the other at the US101. Concrete ledges poured by private owners have also created pools where currents undercut them. The longest seen in May 1999 was estimated as 25 feet in length and possibly 4 feet deep. The smallest such ledge pool

was about 7 feet in length and perhaps a foot deep. Four undercut concrete sills of this nature were identified in May 1999. Two natural pools have formed amid rocks and concrete rubble in the oxbow, a short distance upstream of the freeway. Each was approximately 10 feet long, 1½ feet deep and as wide as the channel. If these pools persist through the summer and fall, they would constitute noteworthy refuges for aquatic life in the oxbow area of the existing watercourse.

While these isolated pools were evident in May 1999, on the whole, Mission Creek lacks any substantive areas of runs, riffles, pools, turbulent waters and eddies.

R **Instream macro-invertebrate fauna**: An experimental comparison of three different places in Mission Creek by students at UC Santa Barbara hints at greater diversity of species where natural sediments make up the stream bottom, compared to locations where the bottom has been hardened (McGoogan and Rose, 1999). Data presented contain counts of species recorded by a standard stream sampling technique, but not counts of individuals within those species. The animals caught actually include a number of terrestrial arthropods, as well as aquatic arthropods, segmented worms, molluscs, algae, and amphibians. Hence, they give a glimpse of the diversity of invertebrates which inhabit parts of the streams, from its bottom to lower portions of the banks. The sampling location with a strictly natural bottom, from boulders 1-2 meters in diameter to gravels and sands in quieter stretches, had the greatest number of species. That with solid concrete bottom had the fewest. No statistical analyses of these data were reported, so differences cannot be claimed as significant. Additionally, the site with natural bottom sediments happens to be at the highest elevation (above the Botanical Gardens) while the other two are below Oak Park. An unexpected influence of more urban setting at lower elevations could have a causal effect on this difference.

R **Water temperatures**: The City of Santa Barbara gathered diurnal temperature records at nine locations in the riverine portion of the project area, between Valerio Street (upstream of the project area) and the oxbow in June 2000. The locations, techniques, and original data may be found on file at the USACOE Los Angeles District offices and at the City of Santa Barbara. Two distinct patterns appear in these data. First, water temperatures at any given sampling station tend to be higher as the day advances. Secondly, at any hour of the day higher water temperatures were recorded the farther downstream from the CalTrans Channel. Water temperatures ranged between 63° F at 7:30 AM below Canon Perdido Street to about 75½° F at 1:30 PM between Bath and Cota Streets. The data also indicate that shading of the stream bed, sample site between de la Guerra and Ortega Streets, moderates water temperatures in June only to a limited degree:

"Partial and full shading of the channel bed by large over hanging trees reduces peak water temperatures by about 5 degrees F in the early summer. This is considered only a modest reduction in temperature, perhaps because other factors have an equal or greater influence, such as the latent heat contained in the water as it travels downstream." (URS Corporation, 2000 -

Sunlight warming water as it passes through the CalTrans Channel may have an overriding effect on water temperatures within the upper portion of the project area during the summer and fall months (URS Corporation, 2000). Similar solar heating may take place within the sandstone channel, since sunlight is not blocked by anything during midday.

Estuary conditions: The riverine traits of Mission Creek begin to change roughly at the Yanonali Street bridge. It is creek-like above that point, progressively more estuarine below as saline water moving upstream from the ocean mixes with fresh water coming down Mission Creek to create a narrow estuary above Cabrillo Boulevard. In fact, just at the Yanonali Street bridge, a man-made sill about 15 inches high and spanning the entire channel would block any significant daily tidal flush farther upstream than Yanonali Street. Except during exceptionally high tides and driven by storms at that, brackish water probably never reaches much above the lower end of the sandstone-wall channel.

R Its length varies seasonally. In September 1997, for example, estuarine properties became evident between Yanonali and Mason Streets, but a photograph made in February 1998 shows brackish water barely as far upstream as State Street. During the rainy season, runoff could push salt water as far down the channel as the lagoon below Cabrillo Boulevard.

Measurements of relevant water chemistry properties reveal this seasonal influence. The City of Santa Barbara engaged a private contractor to sample water in Mission Creek at two locations on a weekly schedule beginning in late November 1994 and continuing through October 1995. Locations about 65 yards apart were chosen near the lower end of the estuary. Samples from the lower site came from the upstream side of the Cabrillo Boulevard bridge, and those from farther up the estuary came from the upstream side of the State Street bridge (City of Santa Barbara, 1995). No details of sampling techniques are available. The graphs which follow, Figs. 10.2, 10.3, and 10.4 , summarize the seasonal patterns of salinity, turbidity, and water temperature.

Water in the open ocean off Santa Barbara would have a total salinity approximately 35 grams per liter (g/l). Water in this lower part of the estuary is somewhat diluted in the summer months, approximately 20 g/l, and may be virtually free of salt during times in the wet season (Fig. 10-2). Peak salinities (approximately 30 g/l) occurred between mid-June and early January

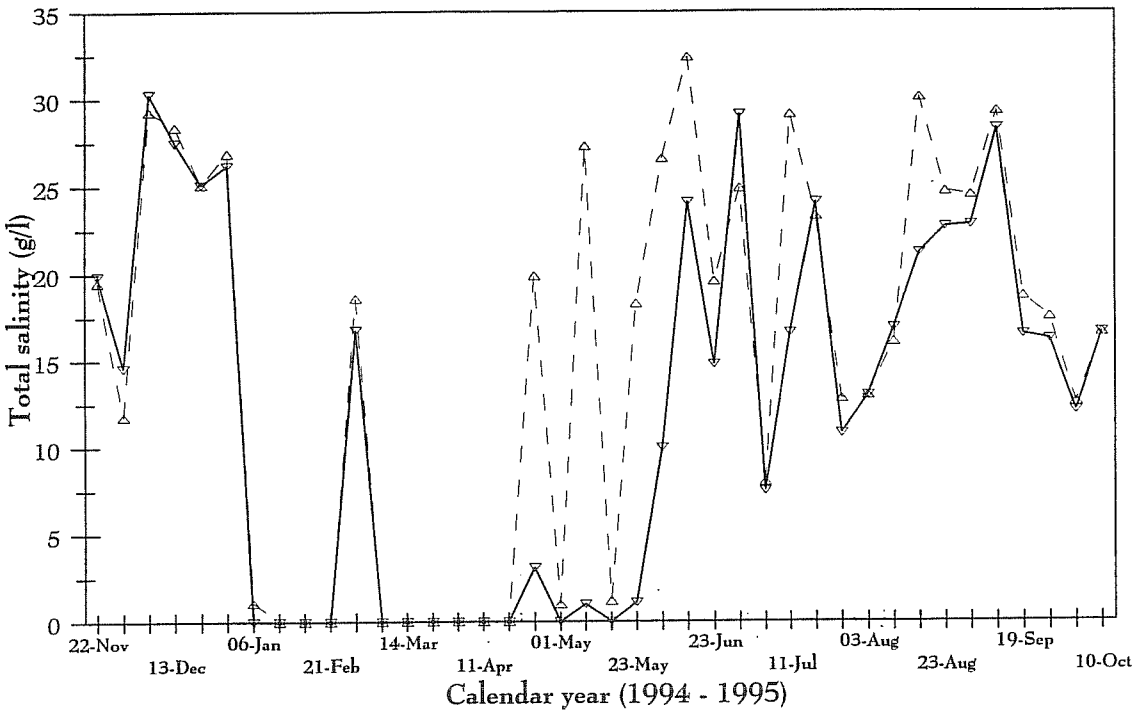


Fig 10-2. Salinity (measured in grams per liter, g/l) at two sampling locations in the Mission Creek estuary. Measurements shown by the dashed line came from the upstream side of the Cabrillo Boulevard Bridge; those shown as a solid line were taken on the upstream side of State Street Bridge. Despite a few dates when salinity differs between the two sample locations, the differences between them overall are not significant, $p(F_{1,76} = 1.501) = 0.22$.

that year, when the minimal amount of water flows from the Mission Creek watershed. During the winter months, steady runoff sweeps saline water out of the lagoon and salinities were below the sensitivity, less than 1g/l, of the measuring instrument (a refractometer). Note an anomalously high spike of saline water (18 g/l) about the 1st of March 1995. It does not correspond with a curiously high temperature (Fig.10-4), as might be expected during a run of dry weather.

Overall, the estuarine water just before Mission Creek opens into the lagoon contains rather little suspended sediment, as measured by total turbidity of the water column (Fig. 10-5). With the exception of two sharp increases of turbidity caused by heavy run off, the first in mid-January and the second in mid-May of 1995, turbidity ranges from levels less than 1 NTU to

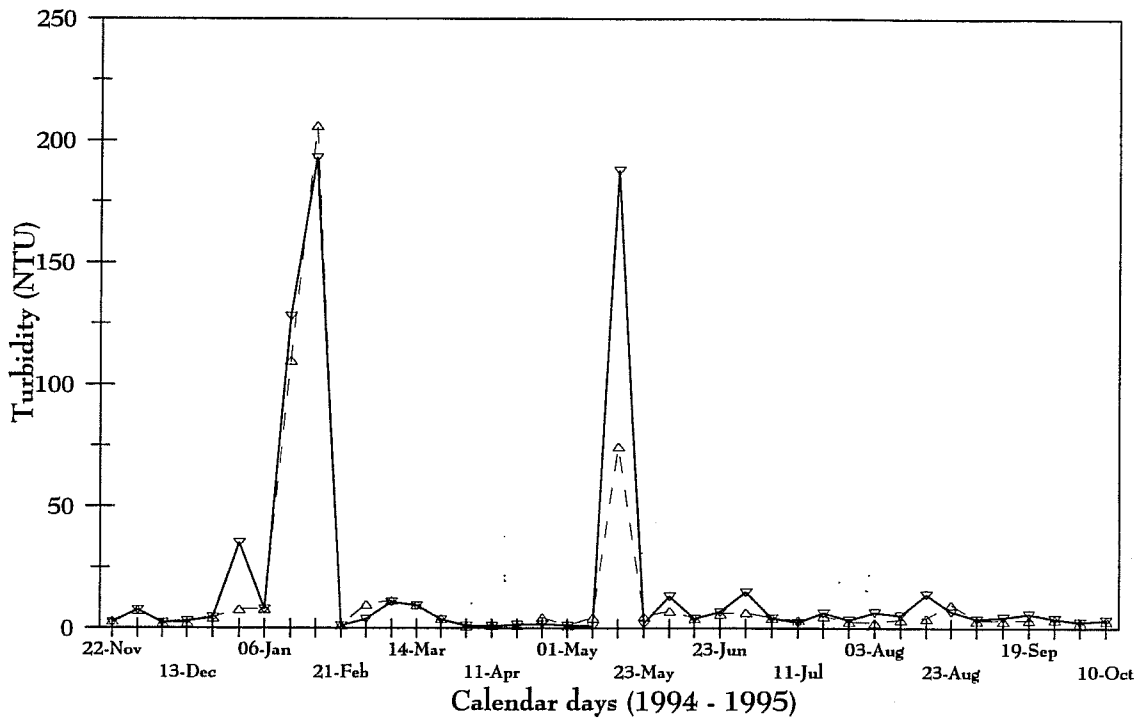


Fig. 10-3. Total turbidity (measured in nephelometric turbidity units, NTUs) at two sites in the Mission Creek estuary. Lines and symbols follow the convention of Fig. 10-2.

about 10 NTU. While not a measurement which most people commonly encounter, nephelometric turbidity units (NTUs) provide a quantitative measure of light scattering by all the solids suspended in a water sample: e.g., a glass of water measured as about 15 NTU looks faintly cloudy to the eye.

Sediments contributing to turbidity of Mission Creek would seem to originate from rather different sources in a manner also linked to climatic seasonality. The meager and non-continuous flow down Mission Creek seen in September 1997 would be incapable of transporting sediments a significant distance along the channel. Urban runoff from streets that enter via storm drains under bridges, particularly at Mason Street, could add somewhat to turbidity farther downstream, but most of the opacity of water in the estuary is probably due to roiling of the water caused by daily tidal fluctuations. The rise in stream volume and velocity coinciding with the onset of winter rains would carry sediments through the estuary and out into

the lagoon, and could reasonably account for the fluctuations seen between December and May of 1995 in Figure 10-3.

Water temperature also follows a noticeable seasonal pattern (Fig. 10-4). By mid-January, the water temperatures are likely to be between 15° C and 17° C, then rise gradually to about 23° C by mid- August. Temperatures start to cool through the fall. Times when net movement of water through the lower end of Mission Creek nearly ceases and water temperature rises quickly, as in late December and early January of 1995, are probably transient events.

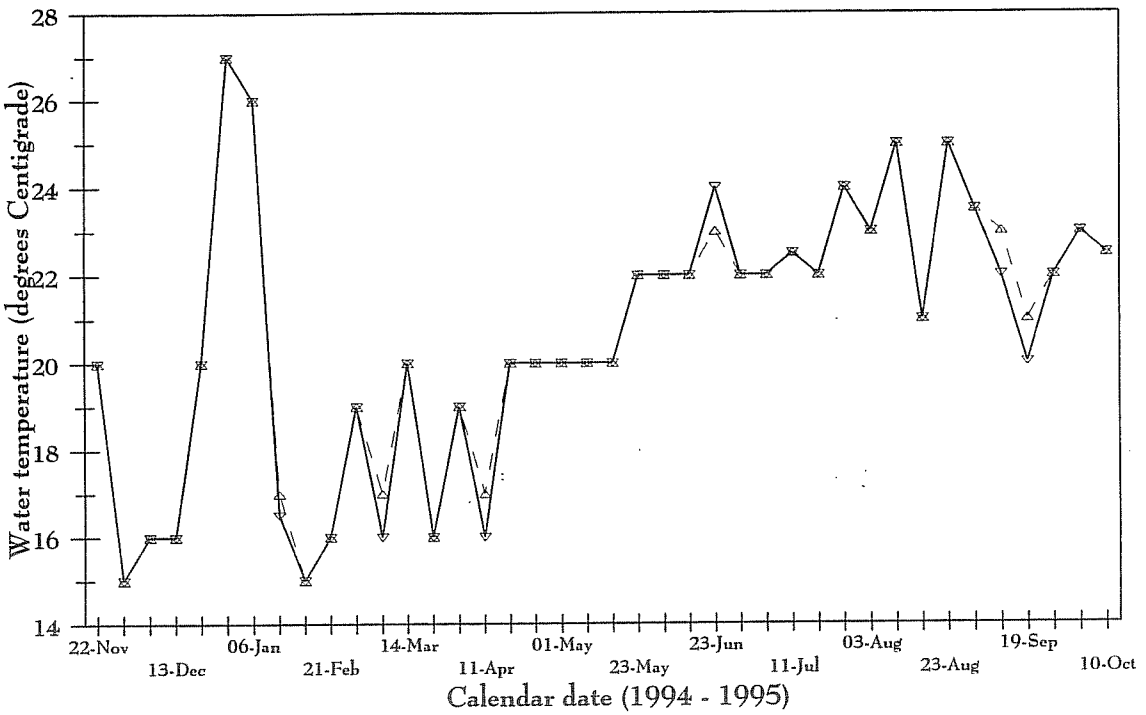


Fig. 10-4. Water temperatures (degrees Celsius) measured at two sampling locations in the Mission Creek estuary. Lines and symbols follow the convention of Fig. 10-2.

Organisms with comparatively narrow tolerances for temperature fluctuations could be adversely affected by such unseasonable rises.

R The relationship between water temperature and depth of water in the estuary was investigated on June 10th and 13th , 2000 (URS Corporation, 2000). Measurements were made at depth intervals of 6 inches, in the morning and afternoon (times of day not stated more exactly) at the State Street and the Mason Street bridges. The pattern is the same at both locations in June. Temperatures in the shallowest water, 6 inches, were found to be very close to 70° F, whether in the morning or the afternoon. Maximum water depths at both locations (60 inches at Mason Street and 66 inches at State Street) were at 87° F, whether in the morning or the afternoon. The pattern of temperature rise is not a linear relationship with depth of water. Descriptions of

measurement locations, techniques, original data and analyses of them may be found on file at the USACOE Los Angeles District offices and at the City of Santa Barbara.

R Salinity did vary more nearly in a linear manner as water depth increased (URS Corporation, 2000). Lowest salinities were measured when the estuary had emptied of tidal water and most of what was present had come down from Mission Creek, e.g. concentrations about 1 part per thousand at a water depth of 12 inches or less at both bridges, and irrespective of whether measured in the morning or the afternoon. Water depths of 60 to 66 inches at both bridges corresponded to salinities of about 15½ parts per thousand, again whether measured in the morning or the afternoon.

R These data indicate that aquatic conditions in the estuary in June are most influenced by tidal movement of water, and less so by the attributes of water coming down Mission Creek. In comparison, temperature and salinity data measured in 1994 and 1995 (Figs. 10-2 and 10-4) can reasonably be interpreted to mean that storm runoff during winter months may swamp the effects of tidal flush in establishing general water conditions in the estuary.

R **Quality of aquatic habitat**: The HEP computations (Appendix C) yield a total value of 0.73 habitat units for aquatic habitat along this region of Mission Creek.

10.2.2 **Stream Bank Habitat**:

Stream bank surfaces: Between Canon Perdido Street and Cabrillo Boulevard, Mission Creek passes through a highly urbanized section of the City of Santa Barbara. No gallery of tree tops exists within the project boundary, although stately western sycamores and a few other native trees, much smaller and less conspicuous than the sycamores, still thrive in isolation from each other at various locations along the creek. Similarly, no layer of shrubby native plants, such as would be found beneath a tree canopy in natural settings, grows along these sections of Mission Creek. Miscellaneous urban refuse scattered on the stream's banks is a very common sight throughout the project area. In the main, the creek retains little undisturbed quality.

Residential properties line both banks and houses often overlook the creek directly. Commercial businesses have been established at the edge of the Creek in several locations as well. In numerous locations, private property owners have built structural walls that constitute parts of houses, garages, etcetera and which actually form the bank itself. The building is the stream bank. Additionally, private citizens have invested considerable labor and personal expense to create localized bank stabilization structures. The length of Mission Creek sports a remarkable variety of these revetments. Stacked burlap bags filled with concrete, large rocks with soil packed between them, large rocks mortared together, sprayed concrete surfaces, grouted stone, jointed masonry walls, shot-crete walls, wire baskets filled with coarse rock, formed walls, wooden bulkhead walls and pilings, and all manner of combinations of these elements arranged either vertically or sloped to cover the existing bank shape may be found throughout the length of the project. Many lack a solid surface and their efficacy is often doubtful. In lieu of undisturbed natural surfaces along the banks where a bona fide riparian plant community could take shape,

opportunistic vegetation grows in such chinks of these various revetments as happen to provide openings for vegetation to become established.

R The proposed alternative would affect about ¾ of the existing banks within the project's overall area. The other quarter of banks along the lower portion of Mission Creek occurs between Highway 101 and the downstream side of Yanonali Street. By design of Alternative 12, it would not alter in any way the streambed or banks through this reach, which amounts to most of the oxbow and the entire length of the sandstone channel. As it happens, every foot of these banks, about 2060 linear feet counting both sides and all the bridges in between, are entirely bare of plant growth anyway. The length of banks between the upstream side of the freeway and the downstream side of the bridge at Yanonali Street has been disregarded altogether from environmental analyses since it would not be a part of the flood control project anyway.

R The proposed flood control design would reshape all existing banks prior to planting native trees and shrubs along much of the lower creek. Currently though, the presence of hardened bank surfaces exerts a strong effect on the abundance and vigor of plants there. All totaled, 7310 linear feet of stream bank exists within the project area, measured on both sides of the creek and excluding from that total the widths of bridges and their flanking walls and disregarding the segment from the freeway through the sandstone channel. Of the existing stream banks which are not structural components of bridges, 2100 linear feet (29%, counting both sides of the creek) have natural soft surfaces, while 5210 linear feet (71%,) have have been armored by some means or other. In essence, revetments cover about ¾ of these banks.

R These revetments, of quite diverse materials and variable workmanship, are not uniformly solid and impenetrable by plant roots. Where some lengths of protected banks preclude growth of anything, e.g. the right hand bank upstream of the Gutierrez Street bridge, elsewhere within the project area plants do get by and currently inhabit about 4350 linear feet of stream bank. However, plants native to a stream side habitat in southern California are few and far between. Save for venerable and large western sycamores ("skyline trees", in reference to their size and visual prominence) at six locations along the creek, it retains almost none of the stratification of canopy and understory species it must have had a century and more ago. Widely scattered arroyo willows (*Salix lasiolepis*) and white alders (*Alnus rhombifolia*) growing equally sparsely hint of what was once there as additional components of the riparian community.

Predominant vegetation: The banks of Lower Mission Creek sustain a coarse growth of opportunistic perennials in many locations. Invasive non-native species compose virtually the entire plant assemblage along the creek. Giant reed (*Arundo donax*) forms the most conspicuous element of stream bank vegetation, and probably would rank highest in biomass of anything growing along the creek In the main, this vegetation consists largely of giant reed, castor bean (*Ricinis communis*), tree tobacco (*Nicotiana glauca*), and similar invasive aliens. They have taken root in any location where roots can penetrate the hardened bank stabilization surfaces that

exist in remarkable diversity along the creek. In places where vertical walls already exist, giant reed can be found growing in dense stands at the top of bank protection features. Salt cedars (*Tamarix* sp.), alien and highly invasive weedy trees, are established in the sandstone channel. Another alien species, pampas grass (*Cortaderia jubata*) lines most of the existing left-hand bank (looking downstream) between Mason and State Streets.

The weedy growths lack the structural arrangement of the understory layer of plants which would prevail here if natural seral successional process had not been interrupted by urban development. Remnants of willows can be found in a couple locations at the foot of the bank where machinery did not completely remove them during recent maintenance of the lowest parts of sloped banks. Eucalyptus trees grow in several locations which happen not to have hardened revetments, but these few trees have precarious attachments to the bank and most are currently being undermined by periodic high flows.

R **Scattered native tree species**: Large trees native to the coastal plain still grow in a few locations below Canon Perdido Street. Western sycamores (*Platanus racemosa*) grow at six locations along both sides of the channel (Fig. 10-5). At three of these places, what appear to be more than one tree have taken root. No genetic or physiological data exist to resolve the possibility that these are actually multiple trunks diverging from the crown of a single root system, i.e. one individual tree. Three such trunks can be distinguished just upstream from the Bath Street Bridge, two trunks between Bath and Cota Streets, and two large trunks and two smaller ones just below the Mason Street Bridge. The occurrence at any one location of multiple sycamore trees (or a single individual which grew to have multiple trunks) growing nearly from the same spot does not change the ecological worth of such trees when such locations are notably isolated from each other. The joint canopy formed this way actually covers no more ground than that of single, very large trees such as the one on the right hand bank below De la Guerra Street. The trees must be accounted for as individuals, but their overall ecological value does not extend beyond the location they occupy on the banks. Counting all the large, apparently separate trunks as distinct trees brings the total within the project reach to 10 western sycamores. One coast live oak (*Quercus agrifolia*) and one battered cottonwood (*Populus fremontii*) also grow on the lower part of the banks. Additionally, four arroyo willows (*Salix lasiolepis*) and a pair of white alders (*Alnus rhombifolia*) have also survived periodic channel maintenance by the lucky chance of being rooted on the overbank above private revetments. In total, 18 large trees belonging to five species have been noted within the area to be disturbed by the proposed project.

R Were these not, in fact, solitary trees but parts of contiguous bands of trees, they would represent an ecologically significant element of the natural riparian community. That is not the case, however. Each has survived as an essentially isolated individual, and all are spread too far apart to form the core of any localized segment of riparian plant assemblage. No contiguous canopy exists and urban needs prevent any notable understory of riparian species from becoming established beneath these singular trees. These few singular trees constitute a biological resource best treated as individuals that hint at the nature of the plant community that once grew along

Mission Creek, but are now too sparse to influence the ecological structure and functions of Mission Creek.

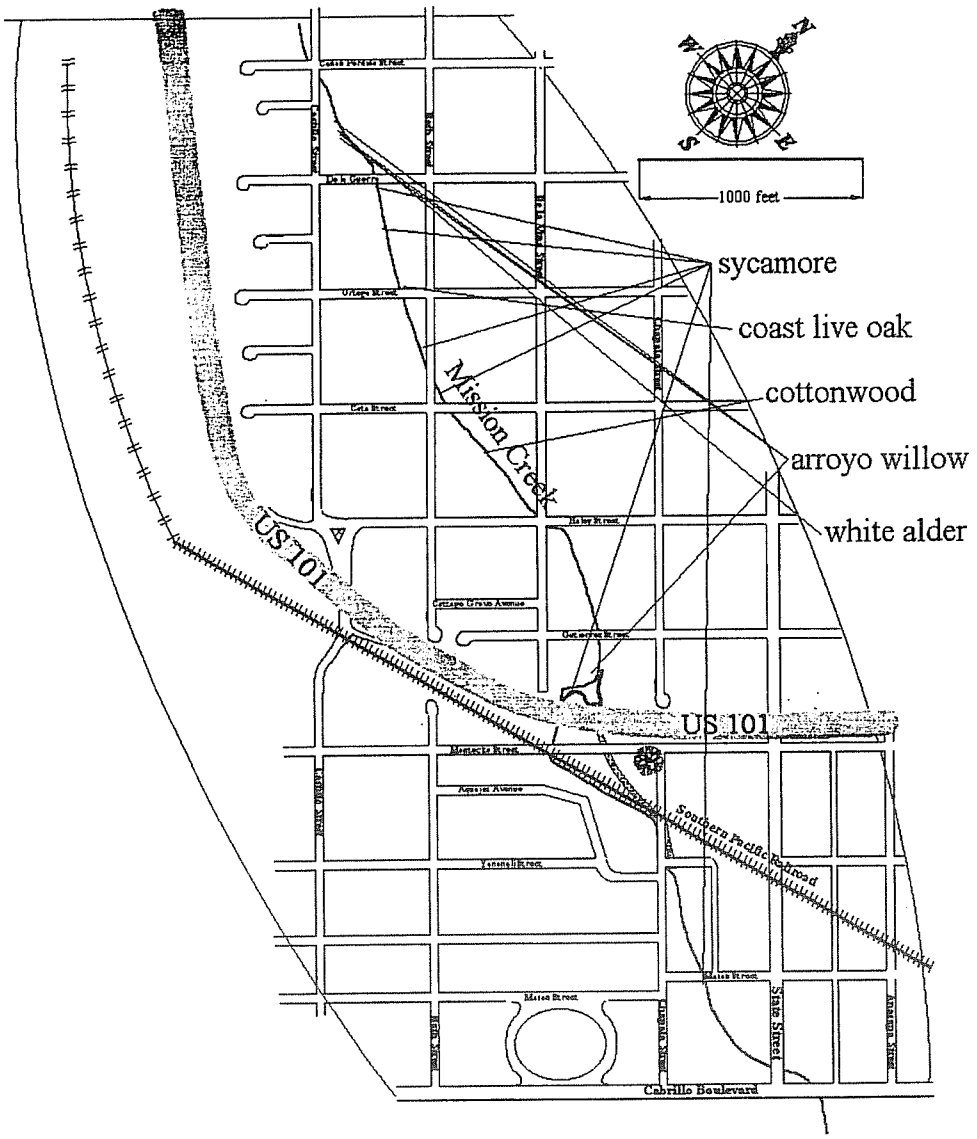


Fig. 10-5. Five species of native trees grow at various locations along Lower Mission Creek. Western sycamores grow in clusters (or a single individual has multiple trunks) just upstream of the Bath Street bridge, between Bath and Cota Street bridges, and immediately downstream of Mason Street bridge.

Quality of stream bank habitat: A modified Habitat Evaluation Procedure (HEP) was used to determine a quantitative description of existing stream bank habitat. All details of the calculations appear in Appendix C.

All totaled, the existing conditions of stream banks have a value of 0.48 habitat units.

10.2.3 **Wildlife**:

During field reconnaissances of the entire Lower Mission Creek channel in September 1997 (late summer) and May 1999 (late spring), a group of plant and animal species was noted, but this was not intended as a systematic and complete listing of all biota. The relevant plant species have already been mentioned. For the most part, only birds were seen directly, being active during mid-day. Included were Anna's hummingbird, black phoebe, yellow warbler, common yellowthroat, snowy egret, green-backed heron, red-shouldered hawk, mallards, and numerous shore birds on or around the lagoon on the south side of Cabrillo Boulevard. Local birding enthusiasts do not commonly scrutinize the lower reach because of the difficulties posed by access across private property. They thus have limited information about the importance of this reach as a sanctuary for birds in an urban setting. It may be important as a stopover focus for south-bound winter migrants. Lower Mission Creek falls within the geographic area included in the Audubon Christmas bird count (Joan Lentz, personal communication). Tracks of house cats and domestic dogs were seen regularly in mud along the creek, and less frequently were those of racoons, opossums, and skunks. Pacific tree frogs (*Hyla regilla*) have been seen (or heard) in late summer and spring. Indeed, during late spring males could be heard calling from concealed perches above head height. No other amphibian species have been seen in Mission Creek. Fish species are not numerous evidently, although individuals of those which live there can be plentiful. For example, partially-armored sticklebacks (*Gasterosteus aculeatus microcephalus)* were quite abundant in many places above the freeway and ranged between very young to large adult sizes, 15 to 70 mm at least. A single prickly sculpin (*Cottus asper*) was found above the Mason Street bridge. Topsmelt (*Atherinops affinis*) swam in estuarine water to feed above Mason Street, but did not go even as far as Yanonali in late spring. Striped mullet (*Mugil cephalus*) could be seen feeding closer to the State Street Bridge. No other fish species have been confirmed during recent field visits.

A large and diverse element of the biotic community fulfills an ecological role, important especially from the human point of view, largely without even being noticed as likely as not in urban Santa Barbara. Bats take a prodigious number of insects every night during spring, summer and early fall months. Without being mindful of their presence, residents and visitors enjoy evening activities with far less irritation from insects than would be the case otherwise. The undersides of bridges across Mission Creek probably provide a significant proportion of all roost sites in this region of Santa Barbara (Collins, 1999). In the general area of lower Mission Creek, deep crevices and hidden recesses within the structure of bridges probably constitute the majority of the type of shelter bats prefer during the daytime. Bark crevices and hollowed limbs or trunk of large trees afford shelter for some species. The California Department of Fish and

Game regards a species previously identified in the vicinity, the pallid bat (*Antrozous pallidus*), as warranting special concern. Townsend's big-eared bat (*Corynorhinus townsendii pallescens*), also a State species of concern, roosts elsewhere in Santa Barbara County but has not been observed in Santa Barbara. The roost site known to be occupied by big-eared bats and closest to Mission Creek is north of the mountains, at the bridge where State Highway 154 crosses the Santa Ynez River (Collins, 1999). Reasonable estimates for population sizes and breeding success of bat species in lower Santa Barbara have never been attempted, nor have systematic trapping studies been conducted anywhere on the lower reaches of Mission Creek (Collins, 1999). The bare minimum of descriptive data indicate the presence of at least six additional species in the vicinity where flood control measures would be implemented, including: the Mexican free-tailed bat (*Tadarida brasiliensis*), the red bat (*Lasiurus borealis*), California myotis (*Myotis californicus*), Yuma myotis (*M. yumanensis*) the hoary bat (*Lasiurus cinereus*), and the big brown bat (*Eptesicus fuscus*). Big brown bats use the bridge where Foothill Road crosses over Mission Creek as a roost site (Collins, 1999).

10.2.4 **Threatened and Endangered Species**:

Most Federally protected animal species, which depend on the microhabitats associated with riverine and estuarine conditions and whose historical range may have included the Mission Creek watershed or at least the higher elevations of the Santa Ynez Mountains, have been displaced from the lower reach by urban expansion and the concomitant loss of suitable habitat. These include four amphibians: the red-legged frog (*Rana aurora*), foothill yellow-legged frog (*Rana boyleii*), the southwest arroyo toad (*Bufo microscaphus*) and tiger salamander *(Ambystoma tigrinum*). Two bird species, Least Bell's vireo (*Vireo belli pusillius*) and southwest willow flycatcher (*Empidonax traillii extimus*), still might rarely occur as transients but neither would be able to nest successfully and fledge chicks from this narrow riverine strip. Both species may have bred here historically. The light footed clapper rail (*Rallus longirostrus levipes*) might once have inhabited marshy areas along the lowest portion of the creek, between the oxbow and what is now the harbor. Prior to historic development of the Santa Barbara area, California condors (*Gymnogyps californianus*) would have foraged over this stream bed on occasion.

Transients or established populations of Federally protected birds are not uncommon at the shore. Snowy plovers (*Charadrius alexandrinus nivosus*) regularly attempt to nest at Cabrillo Point. Their foraging habits would confine them to the strand only, and thus this shorebird should never venture up Mission Creek. Least terns (*Sternus antillarium*) migrate along the coast and thus are seen every year, but this small tern would only be present on the estuarine portion of Mission Creek and then only as a brief transient to hunt small fish. Brown pelicans (*Pelicanus californicus*) are regular and year-round inhabitants of the harbor, but also would never enter this project area under normal circumstances.

The lower part of Mission Creek affords significant habitat for two Federally endangered fish species, the tidewater goby and southern California steelhead. Adult steelhead use Mission

Creek as a migration corridor to spawning beds upstream, while young steelhead swim the reverse when physiologically mature enough to return to the ocean. A coastal, tidal lagoon forms in the summer months where Mission Creek empties into the Pacific Ocean, on the beach side of Cabrillo Boulevard. It provides the principal habitat for gobies and is essentially a marine environment.

10.2.4.1 **Tidewater Goby (*Eucyclogobius newberryi*, Federally Endangered)**:

R The estuarine conditions found in Mission Creek between Cabrillo Boulevard and Yanonali Street provide foraging habitat for tidewater gobies. The species was detected in the estuary in 1994 (Lafferty and Altstatt, 1995), specifically just upstream of the Mason Street bridge (Lafferty, 1998). Biologists from the USFWS, National Marine Fisheries Service (NMFS), and the Corps searched diligently but found no tidewater gobies anywhere in Mission Creek during site visits in May, 1999. Likewise, visual scrutiny of parts of the estuary during a low tide in early May 2000 turned up no sightings of tidewater gobies.

R As a generality about most populations of tidewater gobies, the life history of the species lasts about a year, although some evidence indicates a quite small fraction of individuals in some populations may live to a somewhat older age. Numerous recent experimental studies (U. S. Fish and Wildlife Service, 1999a) paint a combined picture of a species classically described as being "r-selected", i.e. one whose ability to disperse to unoccupied habitat, inherited tolerance of broad and sometimes variable ecological conditions of that habitat, and whose reproductive traits allow it to populate any suitable site in a very short time make the species' overall reproductive behavior approach nearly the maximum rate of which it is capable. The "r" refers to that tendency to turn out many young quite quickly in accordance with the intrinsic rate of reproduction characteristic of that species in these environments.

R Dispersal ability of tidewater gobies would appear to be a key trait in the life history. Concerns about its rapid disappearance from many formerly inhabited waters were a strong impetus to federal protection of the species. Yet since then, numerous reports of the species seemingly having been extirpated from a stream system it once indisputably occupied, then recolonizing it a few seasons later could be cited. Recent experimental data can be interpreted as showing the species has genuinely better talents for getting from an inhabited stream to nearby unoccupied habitat (Lafferty, et al., 1999) than was believed true when the Fish and Wildlife Service concluded it warranted Federal protection under the Endangered Species Act.

Coastal wetlands and their estuaries that get closed off seasonally by natural deposition of sand and cobbles, which in a previous era were widespread and isolated from each other between Agua Hedionda Lagoon (south of Oceanside, in San Diego County) and Tillas Slough where the Smith River discharges (Del Norte County), afforded excellent habitat for this small fish (Capelli, 1997). The species typifies a pattern of genetic and phenotypic differentiation among fish species (Swift, *et al.*, 1993) endemic to coastal California wetlands where the comparatively limited habitat at each location is also geographically and ecologically isolated from other similar habitats (Swift, 1989). Loss of that wetlands habitat poses a serious threat to the existence of natural populations (US Fish and Wildlife Service, 1994).

R Although tolerant of nearly fresh water for short periods, it favors salinities established by the mix of fresh and estuarine waters, a moving zone that shifts back and forth with daily and seasonal flow and ebb of the tides, i.e in the range of 10 to 15 parts per thousand (Capelli, 1997: personal communication). Salinity of sea water along the California coast typically measures about 35 parts per thousand. California estuaries which normally have an extensive tidal flush twice a day and salinities between about 20 and 33 parts per thousand prove uninhabitable to *E. newberryi* (Cappelli, 1997). The fluctuations in both salinity and temperature measured at the lower end of Mission Creek (Figs. 10-2 and 10-4) exemplify the water conditions this species seeks out.

R Reproduction takes place in lagoon-like settings with coarse sandy bottoms. Seasonal presence of the lagoon at the mouth of Mission Creek probably depends on a rough balance between runoff of fresh water coming down from the mountains, in the winter and spring by and large, and the summertime deposition by long-shore transport currents and local wave action of a sandbar which blocks the mouth of Mission Creek. Tidewater gobies spawn in such lagoons, where proper conditions of salinity, water temperature, and coarse sandy bottoms persist from spring or early summer through the onset of winter rains (Swift, *et al.*, 1989). Males establish small breeding territories, scoop out small depressions, then wait for females lay eggs in the depressions. Males may guard eggs and young fry from several females.

The estuarine conditions above Cabrillo Boulevard provide important food resources for tidewater gobies. The species was detected there in 1994 (Lafferty and Altstatt, 1995). Structural alterations of Lower Mission Creek could conceivably have an impact on tidewater gobies in that estuary and the lagoon to the south of Cabrillo Boulevard.

R Tidewater gobies seemingly will eat whatever is available that is of about the right size, including small assorted crustaceans, the aquatic larvae of many insects, and snails (Irwin and Soltz, 1984; Swift, *et al.*, 1989). The species has evolved in transient coastal environments which favored the physiological ability to convert those nutrients into large numbers of young. Such species are also prone to sudden disappearances of local populations. Over time, they usually exhibit a pattern of very high numbers for a few generations, then dramatic crashes of numbers. Often dispersal from nearby populations brings new groups of genes into a local population, which may stimulate a quick resurgence of numbers. This general pattern may lie behind the seemingly low numbers of tidewater gobies in the Mission Creek system over the last decade.

Critical habitat for gobies: Critical habitat for tidewater gobies has been designated (U.S. Fish and Wildlife Service, 1999b). All the watersheds included in that decision occur to the south of Aliso Creek, in Orange County. Mission Creek does not provide habitat critical to the continued existence of tidewater gobies.

10.2.4.2 **Southern California Steelhead (*Oncorhynchus mykiss*, Federally endangered)**:

R Mission Creek typifies the numerous streams suitable for steelhead located south of the Santa Ynez River, streams whose watershed was comparatively limited by the mountains to the north and the streams themselves fairly short and relatively small, where in times past young fish swam to sea and adult fish returned to upper reaches as allowed by the runoff conditions of southern California's climatic irregularities (Cardenas, personal communication, 1998; Spina, personal communication, 1998; Trautwein, personal communication, 1997). Historic changes to watersheds and the riparian communities along streams which followed the settlements of and expansion throughout coastal California by Europeans, and were brought about by their systematic institution of agrarian economies, quickly degraded steelhead streams such as Mission Creek to greater or lesser extent. Urbanization continued that degradation. Nonetheless, it remains among the coastal streams of southern California considered by NMFS as a significant migratory corridor for steelhead when that agency designated the population of steelhead resident in the coastal waters of southern California an Evolutionarily Significant Unit (ESU) and listed the species as endangered (National Marine Fisheries Service, 1997). The California Department of Fish and Game concurs, reckoning Mission Creek as affording irregular but genetically vital opportunities for adult steelhead to reach upstream spawning beds during the winter months in small numbers (Cardenas, 1998).

The natural bottom, albeit slightly squared in profile by periodic channel maintenance and constrained by numerous private revetments of assorted design, still promotes the capability for steelhead to make a winter run up Mission Creek (Cardenas, 1998; Spina, 1998) and young steelhead trout, often called smolts, to swim down its length. Concrete, trapezoidal channelization of the stream bed and banks upstream of this project probably hinders potential migration both directions in Mission Creek (Cardenas, 1998). Despite this physical impediment and the existence considerably farther upstream of a small dam across Mission Creek to catch debris, the California Department of Fish and Game regards Mission Creek to be among the better streams for anadromous trout south of Point Conception because it still affords satisfactory capacity for salmonids to navigate the channel (Cardenas, 1998).

Part of the reconnaissance phase study which the Corps completed in 1995 sought definitive evidence regarding steelhead in Mission Creek. Systematic live trapping for salmonid fishes in Mission Creek did not detect migratory smolts in fish traps erected between Haley and Gutierrez Streets between April 26 and June 6, 1995. Electroshocking all the likely runs and riffles upstream from that location between April 26 and May 16, 1995 also did not disclose salmonid fish with the phenotypic traits of steelhead (Corps of Engineers, 1995). In total, eight trout were captured throughout the watershed, one near Oak Park and the other seven in Rattlesnake Creek, above its confluence with Mission Creek. Without exception, these fish each had all the features of resident, non-migratory rainbow trout (also recognized taxonomically as *Oncorhynchus mykiss*), were the size of rainbow (average length = 190 mm, standard deviation = 29.6), and all but one were judged by analysis of scales to be nearly two years old. The single

largest fish was more than two years old. Trout of this age, if they were steelhead, would ordinarily exhibit all the changes of appearance that identify them as steelhead smolt. Absence of these features indicates these eight would never display distinctive steelhead attributes.

R The sporadic records of large salmonid fish in the Mission Creek watershed has been the source of differing opinions about its contemporary importance in the life history of steelhead. For example, eleven years elapsed between documented sightings, 1984 to 1995, yet since the spring of 1998 many observations have been reported. The following summaries are indicative of the seemingly irregular appearance of steelhead in Mission Creek:

1984 — Small trout feeding near the Museum of Natural History in early June were identified by a specialist in marine mammals as steelhead (Santa Barbara News-Press, June 3, 1984);

April to June, 1995 — Part of the reconnaissance phase study which the Corps completed in 1995 sought definitive evidence regarding steelhead in Mission Creek. Systematic live trapping for salmonid fishes in Mission Creek did not detect migratory smolts in fish traps erected between Haley and Gutierrez Streets between April 26 and June 6, 1995. Electroshocking all the likely runs and riffles upstream from that location between April 26 and May 16, 1995 also did not disclose salmonid fish with the phenotypic traits of steelhead (Corps of Engineers, 1995). In total, eight trout were captured throughout the watershed, one near Oak Park and the other seven in Rattlesnake Creek, above its confluence with Mission Creek. Without exception, these fish each had all the features of resident, non-migratory rainbow trout (also recognized taxonomically as *Oncorhynchus mykiss*), were the size of rainbow (average length = 190 mm [about 7½ inches], standard deviation = 29.6 mm), and all but one were judged by analysis of scales to be nearly two years old. The single largest fish was more than two years old. Trout of this age, if they were steelhead, would ordinarily exhibit all the changes of appearance that identify them as steelhead smolt. Absence of these features indicates these eight would never display distinctive steelhead attributes;

May 24, 1995 — A single fish between 12 and 13 inches in length and described as having the "hooked lower jaw" reminiscent of steelhead was landed with a barbless fly from a run in Rattlesnake Creek. The fish was photographed, but an effort to take scale samples from it was fruitless (Trautwein, letters, 1995a, 1995b). "Additionally, two fish measuring an estimated 12" each were observed in a pool approximately 100 yards upstream from the site where the largest fish was captured." Other trout seen in nearby pools the same date were of the size range reported by the Corps' study, and thus could plausibly be resident and non-migratory rainbow trout;

1998 and1999 — Following the heavy runoff from El Niño rains in the spring of 1998, numerous large fish were reported at several locations above Oak Park in the fall of 1998. Knowledgeable ichthyologists were convinced by the body length, body depth at the pectoral fins, color patterns, and general behavior that these salmonids could not be anything other than steelhead (Cardenas, 1998; Johnson, 1999; Greenwald, 1999). By late June of 1999 very small fish were seen to accompany these larger adults in some of the larger pools near the Museum of Natural History and upstream from there as far as the confluence of Mission and Rattlesnake Creeks (Johnson, 1999).

To date, no genetic data has been obtained from any of these fish. Therefore, they cannot be declared definitively as from the southern evolutionary genotypic stocks;

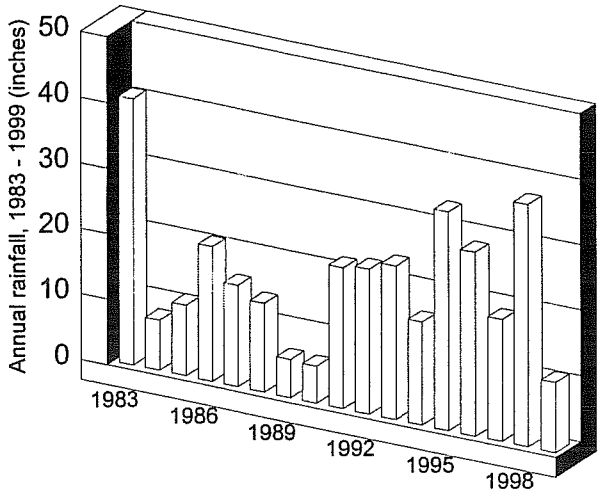
2000 — A female 27 inches in length and a male 23 inches long were documented spawning in poor water and substrate conditions between de la Guerra and Ortega Streets on March 14th. The female made at least three clutches of eggs. The male was seen to fertilize one of them. Later in March, approximately 100 salmonids of the size typical of smolt were seen repeatedly in pools in Oak Park. They seemingly decamped after heavy rains in April, but no observations of them swimming to the ocean have been reported. Two salmonids, also of typical size to be smolt, were observed in salt water below the Mason Street bridge on the 4th of May (Moeur, 2000, field records).

To date, no genetic data has been obtained from any of these fish. Therefore, they cannot be declared definitively as from the southern evolutionary genotypic stocks. However, that some among these fish seen over the last 15 years are steelhead based on physical traits (e.g. size of pair seen spawning in March 2000) and behavior, and therefore that Mission Creek has the potential still to provide suitable habitat conditions in some locations, seems no longer a debatable assertion.

R **Climatic influence over suitable flow conditions**: Irregular appearance of steelhead in coastal California streams seems to be a widespread trait within this part of the species' range. Steelhead belonging to the southern evolutionary population appear rather opportunistic in their migratory behavior, both in the number of individuals who make the ascent in any given year — in fact, years when none are seen anywhere in the creek are not uncommon — and the time of year when they enter the watershed. River flow seems to be the factor which most clearly prompts adults fish to try to reach spawning areas in southern California coastal streams. Since the quirks of winter storm patterns in this region cause quite unpredictable flow patterns from one year to the next, their migratory tendencies are controlled by this climatically irregular but annual phenomenon (Cardenas, 1998).

Rainfall data for the last 17 years are indicative of the variability in climate in the watershed of Mission Creek. Between January 1983 and December 1999, average total rainfall measured at the Santa Barbara Sanitation Station has equaled 19.35 inches. In this Mediterranean climate, very little of that rain comes between May and October, as shown by monthly average totals (Fig.10-6). More than three quarters (78%) of the total annual rain falls in December, January, February, and March.

Four accompanying graphs show total rainfall measured in December, January, February, and March for each year between 1983 and



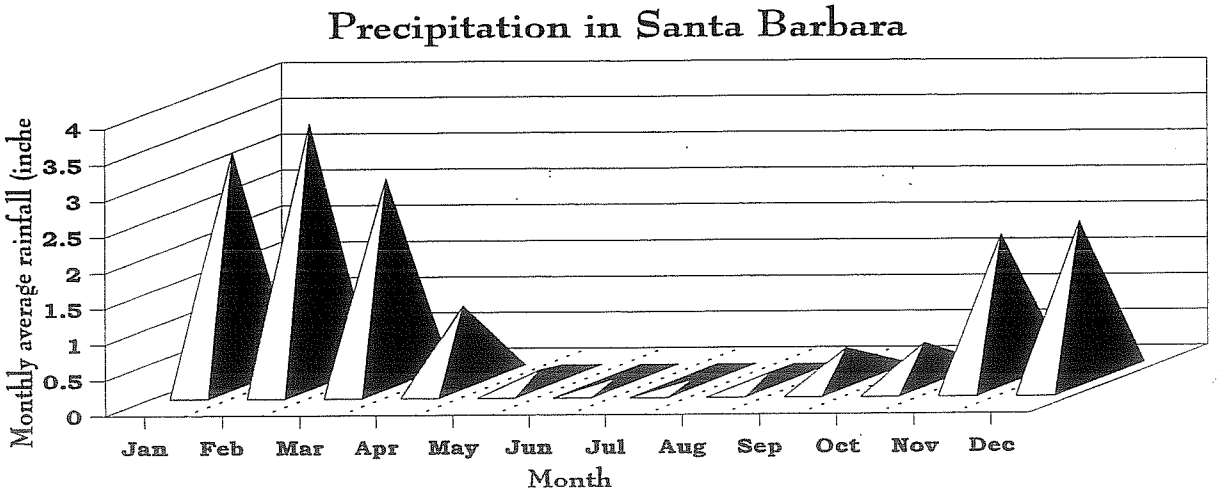


Fig. 10-6. Records of annual precipitation from 1983 through 1999 (upper panel). Average total precipitation was 19.35 inches during this period. Source: California Department of Water Resources; http://cdec.water.ca.gov/cgi–progs/staMeta?station_id=SBR.

Monthly precipitation in Santa Barbara averaged from records between 1961 and 1990 (lower panel). Source: National Weather Service, San Francisco, and made available on the web at http://www.washingtonpost.com/wp-srv/weather/longterm/historical/data/santa_barbara_calif.htm

2000. During the four months of the typical rainy season when nearly all upstream migration by adult steelhead occurs, climate patterns can bring notable rains in December in some years, and very scant rains in others. For example, five to seven inches were recorded during December in1983 and 1984, but rainfall in December of both 1989 and 1990 was virtually nil. In a general way, these records show the rather erratic nature of rainfall in each of these four months from one

year to the next. As another example, the very heavy rains in January 1995 (about 18 inches in that month alone) were markedly greater than January of 1994, less than 2 inches. Virtually no rain fell in February of 1997 but a year later February total rainfall was greater than 20 inches. In fact, February, January, and March have the largest variability in monthly rainfall total, as indicated by standard deviations of 5.09, 4.63, and 3.06, respectively.

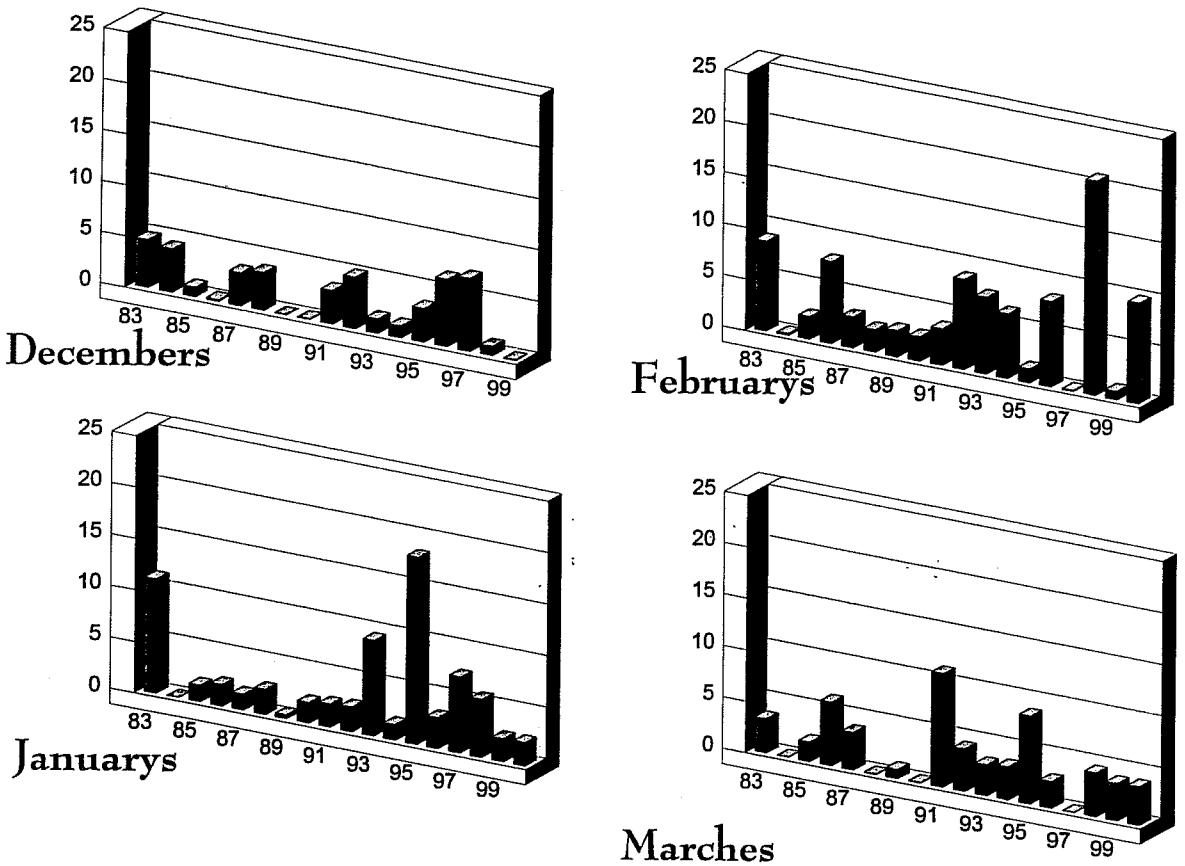


Fig. 10-7. Total monthly rainfall for the typical rainy season in Santa Barbara, 1983 to 2000 except for December. (Source: California Data Exchange Center; http://cdec.water.ca.gov/cgi-progs/staMeta?station-Id=SBR).

The inconsistency between years is often matched by inconsistency between successive months within one rainy season, e.g. the 18 inches of January 1995 were followed by scant rains in February (less than 2 inches), and moderate amounts again in March (about 8 inches, total). As another example, the most recent year of El Niño climatic patterns, 1998, brought about 2½ inches in January, close to 21 inches in February, and only about 4 inches in March.

Steelhead from this region have inherited the tendency to migrate up streams in this region sometime between January and the end of March, but only sporadically from one year to the next in response to the rather fickle patterns of rain during those three months. The inconstant nature of coastal streams such as Mission Creek may well have selected against behavioral tendencies to migrate annually and without fail to spawning beds in the upper portions of the water shed when climatic conditions were not reliable enough from one year to the next to count on be able to reach those beds.

R The reverse migratory behavior young steelhead undertake, leaving the stream in which they were spawned and entering the open ocean, may also happen rather unpredictably for the same climatic reasons. Neither experimental nor systematic observational data from steelhead populations of southern coastal streams about the duration of this passage to the ocean have been gathered sufficient to generalize about the species' life cycle in Mission Creek (National Marine Fisheries Service, 2000). Salt water imposes wholly different physiological requirements on fish when compared to life in fresh water. Steelhead cannot just leap from one to the other when at an appropriate point in their life history. A steady sequence of metabolic transformations happens as "freshwater genes" become inactive gradually while "saltwater genes" start to express their phenotypic characteristics. In a jocular way which, which nonetheless refers to a very complex suite of biochemical and physiological changes that in fact biologists do not yet understand at all well, juvenile steelhead are said to "smoltify". They prepare for marine life, having started out life in fresh water. Stream flow conditions, and weather indirectly, seem to initiate these changes when juvenile steelhead are old enough.

R Smoltification probably begins upstream and juveniles work their way down toward saline water as they become better prepared to live in it, then probably complete the requisite physiological changes there. Evidently the last of this physiological shift takes place while smolts wait their time in diluted salt water. The estuary of Mission Creek still suffices for this requirement for of their life cycle despite its generally poor quality as aquatic habitat. No data regarding their tenure in the lower creek exists. Some individuals may wait only a few days, others a week or two (Stowe, 2000; Cardenas, 2000). It obviously depends on the speed of changes necessary for them to tolerate salt water after the first phase of life in fresh. Those complex changes transform them physiologically from young trout into steelhead smolt, ready to swim finally to the ocean when stream flow or other environmental conditions, also not understood, permit.

R **Critical habitat for steelhead**: Critical habitat for steelhead (National Marine Fisheries Service, 1999a) evidently includes Mission Creek, although detailed maps and watershed descriptions are not available for inclusion in this BA. NMFS identified hydrologic units containing critical habitat for southern California steelhead and that called Santa Barbara Coastal (hydrologic unit No. 18060013) encompasses Mission Creek. In and of itself, this designation would require implementation of the flood control project in a way so as not to "appreciably

diminish the value of critical habitat for both the survival and recovery" of steelhead, and consultation with NMFS under Section 7 of the Act.

10.2.4.3 **Southwestern Pond Turtle (*Clemmys marmorata pallida*, California species of concern)**:

Systematic records maintained at the Natural History Museum of reptiles from the Santa Barbara area begin in the early 1960s (Collins, 1999). They document repeated sightings of individuals above Foothill Road, in the Rattlesnake Creek portion of Mission Creek's watershed. Since then, no records indicate pond turtles anywhere in Mission Creek below Rocky Nook Park.

This species is native to California, west of the Sierra for the most part, and is thoroughly aquatic in its habits. It was very likely to have been present throughout the watershed historically. Pond turtles have a decided preference for localities with permanent aquatic features, such as the margins of lakes, small ponds, permanent and deep pools on slow moving creeks, fresh water marshes, and irrigation ditches where water is always present. Settings where cattails and other aquatic vegetation are undisturbed and grow from a rocky or muddy bottom appear to be better suited. These habitat requirements no longer exist within the construction limits of flood control on lower Mission Creek. Indeed, the two local biologists most knowledgeable of reptiles in these parts of Santa Barbara County spoke of never having seen this species on the lower part of Mission Creek (Collins, 1999; Hunt, 1999), despite several searches specifically for pond turtles in Mission Creek. The latter biologist described lower Mission Creek as "highly unsuitable overall habitat" for pond turtles (Hunt, 1999). No turtles of any size or shape were seen during any of the four surveys of Mission Creek, nor have the distinctive tracks turtles make in soft mud ever been seen.

Pond turtles are known to inhabit a tributary of the Laguna Channel, roughly half a mile to the east of Mission Creek. Moreover, this location appears sufficiently good that *C. marmorata* can reproduce here, as judged by the range of sizes seen basking in the area (Collins, 1999).

All evidence would appear to indicate southwestern pond turtles no longer inhabit this section of Mission Creek.

10.2.5 **Moreton Bay Fig**:

An immense tree, venerated for its size and age as a conspicuous landmark by residents of and visitors to the City of Santa Barbara, grows near Lower Mission Creek, although its genetic adaptations evolved in the coastal subtropical climate of northern Australia. By chance, those adaptations also conform to the maritime climate that prevails immediately inland along coastal southern California. The Moreton Bay Fig (*Ficus macrophylla*) was transplanted as a young tree at the southwest corner of Chapala and West Montecito Streets (Fig. 10-8) in 1877. It has thrived at this site and is said to be among the very largest of its species outside its native range, possibly the biggest in North America. Despite the changes during the last century that were not foreseeable when it was planted at this location — changes away from pastoral and toward more

urban circumstances that have prompted less than optimal soil and water conditions, involving paved roads crossing the northern and eastern sides of its root complex, occasional trenching which passes through parts of its root system along both those municipal roads for installation of pipes, a parking lot paved with asphalt and compacted soils on its southern side — between 1975 and 1991 its trunk expanded 11% in diameter, as measured 5½ feet "above the floor of the buttress roots" and the canopy had grown slightly in height (Britton and Froehlich, 1991). By 1991, the fig tree had a canopy 172 feet in diameter, reaching 76 feet in height.

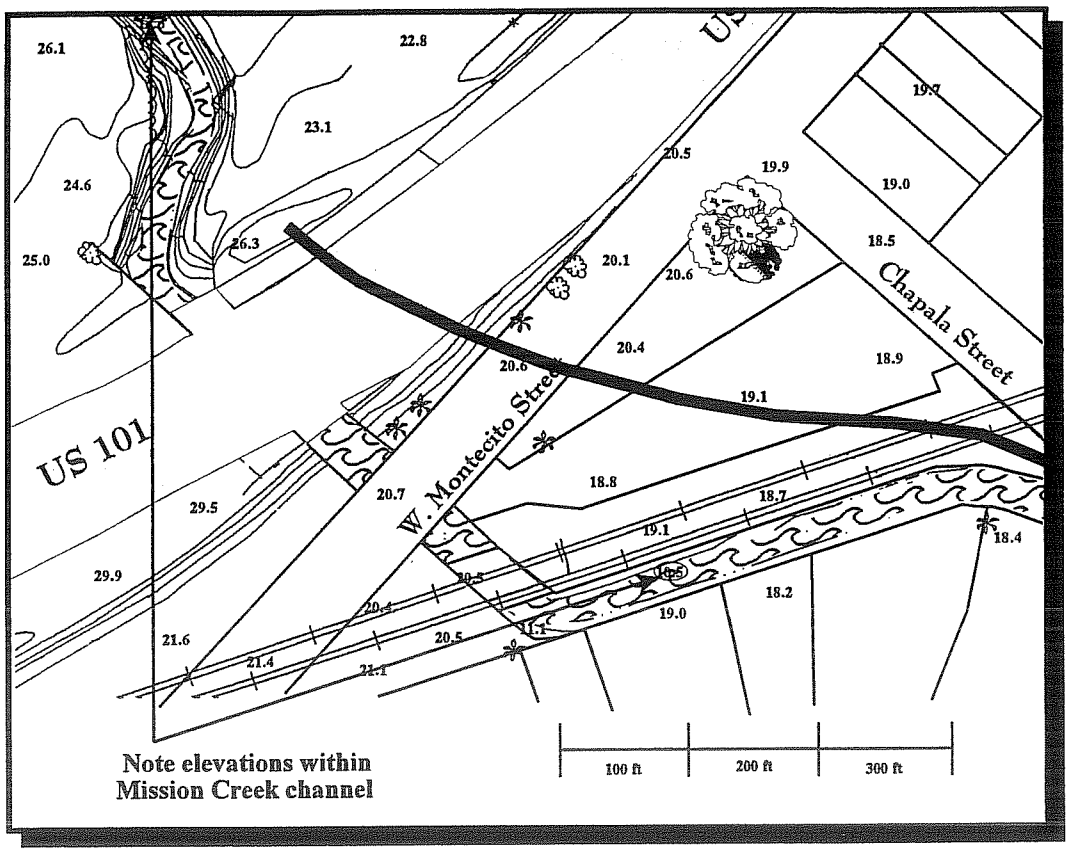


Fig. 10-8. Vicinity of the Moreton Bay Fig, at the southwest corner of Chapala and West Montecito Streets, the "oxbow" of Lower Mission Creek, and the approximate location and size of the box culvert (heavy, dark line) which would bypass the oxbow. Numbers sprinkled throughout the map give spot elevations in feet above sea level. Most property boundaries and other distracting features have been omitted, except where they aid in depicting the immediate surroundings of the Fig Tree and the channel of Mission Creek. The bridge at Gutierrez Street is shown in the upper left corner, and a scale in the lower right.

The sandy loam soil at this site evidently provides sufficient water and micronutrients for sustained growth. Soil samples taken from augured holes 40 inches deep on the east side of the tree show a progression toward pure sand (Rogers, 1995). Given the way most deciduous trees of this growth form develop, the bulk of its root system would lie within the drip line of the

canopy, and possibly reach to a considerable depth. Within the last decade, freeway construction along the north side of Montecito and placement of a sewer line that required a trench 8 feet deep on the west side of Chapala disturbed secondary roots but none of significant size, according to the Arborist for Santa Barbara, Mr. Dan Condon (Britton and Froehlich, 1991).

The tree was planted on ground now about 20 feet above sea level (Fig. 10-8). The tree may have been planted intentionally on a slight hummock, because spot elevations both to the northeast and to the south and southwest of it (ranging from 19.7 to 18.9 feet, and 19.1 to 18.8 feet, respectively) incline away from the tree. A natural slope, slight though it may be, exists between the fig tree and the channeled and angular segments of Mission Creek. In the channel segment immediately south of the Union Pacific Railroad tracks and distinctive for being lined with cut sandstone blocks, the bottom of Mission Creek lies at an elevation of 10.5 feet. This is 2.1 feet lower than its elevation, 12.6 feet, halfway between the Gutierrez Street bridge and the beginning of the oxbow upstream of US 101. Based on these elevation differences, the major portion of water supply from which the fig's roots draw must originate from a water table at least 10 feet below the present ground surface. Close to its buttress roots, the water table is said to lie between 15 and 18 feet deep (Britton and Froehlich, 1991).

Given the lay of the land near the oxbow, subsurface water may pass through native soils on the eastern side of Lower Mission Creek in a general pattern from the northwest toward the southeast. The fig tree, on its slight hummock, likely draws water from the subsurface flow passing on the northeast side of the tree.

10.2.6 **Staging Sites for Equipment and Temporary Stockpiles of Materials**:

Three locations along the creek would become temporary staging areas. Whether each would function throughout the duration of the project construction has not yet been determined.

That nearest the ocean would be located between the railroad tracks and Yanonali Street. It is currently a vacant lot with bare dirt and significant vegetation.

A site approximately in the middle of the project may also be used for another purpose at the end of construction. This is the vacant lot adjacent to the oxbow and owned by CalTrans. A chainlink fence encloses it on the west and prat of the north side, with a commercial building and parking lot comprising the rest of the north side. It ends at the edge of the creek on the east and south. The surface of that lot has annual grasses throughout and apparently gets mowed on occasion. Some ornamental trees grow in the northeast corner. A single large willow grows above the bank of the creek in the southeast portion of the lot.

A paved parking lot behind the church located at the corner of Canon Perdido and Castillo Streets would become the upstream staging site. It provides a convenient access ramp to the creek bed. The parking lot abuts the creek on the west. Aside from that edge where non-native plants have been cultivated, no trees or vegetation exists on this lot.

10.3 CITY OF SANTA BARBARA GENERAL PLAN AND POLICIES FOR BIOLOGICAL RESOURCES:

Evaluation of environmental effects caused by construction of flood control structures on Mission Creek shall not be at odds with general goals established by the City of Santa Barbara. Evaluations of consistency with each of the City of Santa Barbara's plans and policies for biological resources are provided in Section 4.2.3.4 of this EIS/EIR.

To reiterate them:

10.3.1 Conservation Element Biological Resources Goal:

- Enhance and preserve the City's critical ecological resources in order to provide a high quality environment necessary to sustain the City's ecosystem.
- The habitat of rare and endangered species shall be preserved.
- Intertidal and marine resources shall be maintained or enhanced.
- Programs shall be developed to maintain a productive urban biotic community.

10.3.2 Conservation Element Biological Resources Policy and Implementation Strategy:

- A set of land-use suitability guidelines shall be developed for use in land planning and the environmental review process.
- Where not preempted by the Federal Flood Insurance Program, land-use regulations will be developed for the creek influence zones of Mission, Sycamore, San Roque, and Arroyo Burro Creeks.

  a. Assign the task of conducting a biological study of the creek influence zones to the Community Development Department. This study is to determine the general land uses within the zone which would be compatible with the maintenance of the existing biologic communities of the creeks, and is not intended to consider the development of public recreation facilities with the creeks.

  b. Enact a flood control and creek ordinance which would include provisions to restrict channelization in natural creek bottoms and structural developments within the 100-year floodplain in natural creek areas.

10.3.3 **Location of Coastal Program Water and Marine Environmental Policies**:

- The City, through ordinance, resolutions, and development controls shall protect, preserve, and where feasible restore the biotic communities designated in the City's Conservation Element of the General Plan and any future annexation to the City, consistent with the PRC Section 30240.

- The riparian resources, biological productivity, and water quality of the coastal zone creeks shall be maintained, preserved, enhanced, and where feasible restored.

- Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (1) Necessary water supply projects, (2) Flood control projects where no other method for protecting existing structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) Developments where the primary function is the improvement of fish and wildlife habitat.

10.4 EVALUATION OF FLOOD CONTROL ALTERNATIVES IN RELATION TO BIOLOGICAL RESOURCES:

R 10.4.1 **Implications of Design Alternatives, both Structural and the No Action Alternative**:

This Feasibility Study examines several structural Alternatives intended to increase lower Mission Creek's ability to carry storm water flows directly to Santa Barbara Harbor, rather than having them spill out of the existing channel. The degrees of flood control benefits and environmental effects differ among the Alternatives. Every structural Alternative evaluated in the EIS/EIR would initially reshape the existing stream channel and its banks. None can be accomplished without digging the existing streambed, the toe of the banks at the edge of the stream, and the banks which now confine the streambed. Digging must diminish such ecological values as presently characterize the creek by removing the physical features of the creek bed and adjacent banks. It is these very features which confer ecologically useful attributes and the extant habitat properties to Mission Creek. Those features would disappear as excavation proceeds. Some Alternatives would require less digging than others and environmental effects would differ among them therefore.

The details of mechanical excavation, shifting of materials, construction of walls and banks, design shape and size of the finished streambed and its newly made banks, and environmental components which constitute the complete project description of each Alternative

are presented elsewhere (Chapter IV, §F, Tables 8 and 9 of the Main Report, and Section 3 of this document). Each structural Alternative is intended to function for a period of 50 years.

Structural Alternative № 12 has been identified as that which would return the greatest amount of flood control and environmental benefits per dollar spent. It is the recommended Alternative. The environmental consequences of two other structural Alternatives, №s 6 and 8, are also evaluated. Sections 3.4 and 3.5 of this document explain the rationale for focusing on these three and excluding eight other structural Alternatives from further analysis.

The Feasibility Study also examines the consequences of not building any form of flood control, i.e. the No Action Alternative. No excavation of existing streambed or its banks would occur as explicit elements of Alternative № 1. The decision to adopt Alternative 1 leads also to environmental effects which need to be evaluated over the same life time considered for structural plans. In effect, the No Action Alternative amounts to an expectation of conditions in the future in the absence of implementing any of the structural Alternatives, so called as "the future without project".

All Alternatives would entail some level of periodic maintenance to retain the conveyance capacity of this portion of Mission Creek. The environmental effects of future maintenance constitute a distinct part of the overall evaluation.

The analyses of various environmental effects of specific structural Alternatives have been weighed against the future without project. Differences between the alternatives measure the net changes caused by that specific Alternative. Where that net change turns out to be negative, the project design would have overall impacts and appropriate mitigation to rectify that effect would be considered. In contrast, a net change of positive value reflects an improvement to environmental conditions attributable to the design of the project. Comparisons are drawn primarily between Alternative12 and Alternative1.

Analyses of environmental effects make use of a simple convention. The HEP analysis (Appendix C) evaluates the projected changes in habitat quality by separating the proposed project into three separate reaches. They are identified by finished width of the streambed as designed for Alternative 12:

- reach 1 - 43 feet wide, from Canon Perdido Street to Haley Street, riverine in nature;
- reach 2 - 50 feet wide, from Haley Street to Highway 101, riverine, and;
- reach 3 - 60 feet wide, from Yanonali Street to Cabrillo Boulevard, estuarine properties.

10.4.2 **<u>Alternative 1: No Action Alternative (Future Without Project Conditions)</u>**:

R The following analysis assumes that there would be no changes of City policies (§10.2) related to development along creeks.

R Habitat quality in the future would be influenced considerably by property owners' concerns for erosive damage to their land, just as in the past when such protective behavior resulted in virtually every portion of the creek within the project area being subject to various

methods of bank stabilization. Often, the edges (or more than that even) of the streambed have been incorporated into those stabilization efforts as well. It seems a prudent action to undertake as a property owner, for there appears to be less erosion as a result. Unintentionally, though, a revetment fashioned at one location on the creek frequently redirects the stream in an unforeseen way; it starts eroding a section of bank and toe which had not previously been eroding. The property owner at the new erosional site reacts in the same way and as finances allow builds additional revetement. The hydraulic cause and effect sequence, erosion arrested in one location then inducing erosion somewhere else followed by yet more hardening of banks and streambed to forestall that erosion, begins anew. Since each individual effort removes plants, then leaves the surface less habitable for re-establishment of vegetation, and possibly fills portions of the streambed through the need to safeguard the toe of the banks, habitat quality would tend to decrease in a patchy and locally irregular manner over time. In the event no flood control project were built here, the decisions to make irregular and shifting investments in bank protection without an overall understanding of broader hydraulic effects would continue unchanged. As an unintended result habitat quality would be expected to decline from existing conditions.

R 10.4.2.1 **Impact Analyses**:

R The following analyses of potential environmental impacts from flood control measures recognize for all Alternatives two separate types of habitat, namely the aquatic environs of the stream bottom itself, and the extant vegetation along the banks of Mission Creek. Additionally, individual native trees have been included. These trees represent isolated patches of what historically would have been the canopy of riparian plant community. As the trees are widely separated, their functional importance in establishing the canopy layer of a plant growth is much reduced. They have been treated as isolated individuals whose loss must be made up, but whose ecological import has been factored into the overall habitat quality of bank vegetation.

R **Aquatic habitat**: With spatially haphazard and temporally irregular removal of some plants followed by more or less undisturbed further growth, conditions of both the stream bottom itself and the toe of the banks which extend to the stream's margins along Lower Mission Creek could be expected to fluctuate somewhat in habitat value over a run of years. Eventually, this irregular rise and fall of habitat values, in which property owners spend money and time to remove channel blockages and armor the toe against scouring currents, would lead to more extensive patchwork efforts while natural processes steadily undermine those efforts. Aquatic habitat quality should diminish slowly over a span of several years in the absence of coordinated flood control and stream bank erosion solutions.

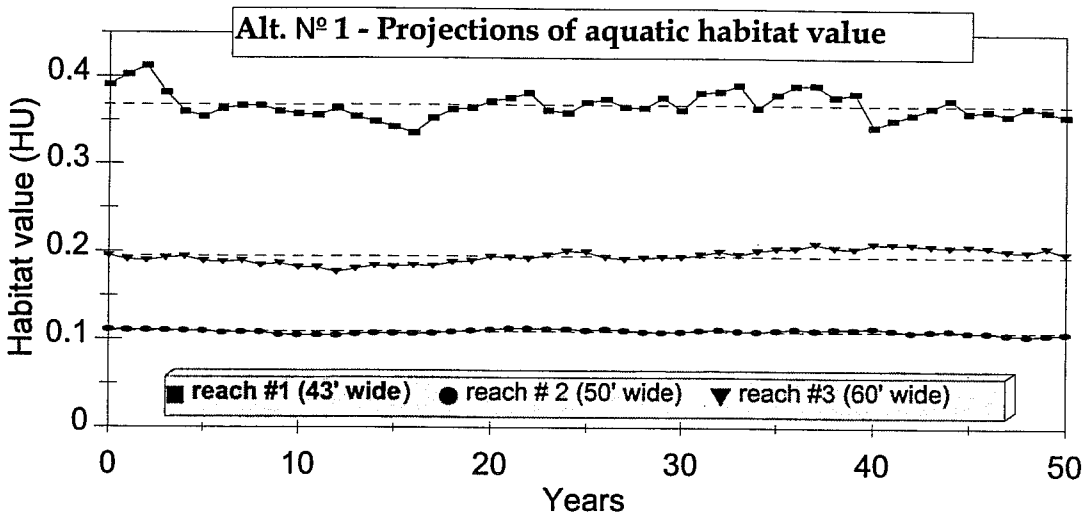
R In addition, maintenance needs by the County to retain the channel's current conveyance capacity would periodically affect aquatic habitat in Mission Creek. Historic rainfall patterns and the consequent accumulation of sediments should not change in any foreseeable way. Maintenance would be indicated when a section of the channel has lost about 15% of its capacity.

In 1997, approximately 350 yd^3 of sediments were cleaned from the streambed between Canon Perdido Street and the freeway, for instance. A rough pattern of de-silting about once every three years has prevailed recently, and should not be different in the future. Historically, this level of aggradation has occurred only in the portions of the creek upstream of the estuary. No sediment removal has been needed in the estuary itself. The analysis assumes sediments and all the plants growing in them would be removed from at least 10% but not more than 25% of the creek bed upstream from the freeway in those occasional years when the channel has lost at least 15% of its conveyance capacity. The needs for more diligent maintenance in some years compared to others ought to cause somewhat erratic fluctuations of aquatic habitat value, probably following overriding climatic cycles. A sequence of winters when comparatively little rain falls could result in less vigorous maintenance activities. In consequence, overall quality of aquatic habitat would probably rise as more plants become established in the channel and small scour pools become quasi-permanent. A single season of heavy rains could necessitate more thorough removal of debris, sediments, and existing plant growth. The result would be a temporary diminution of habitat quality. In the long view, these fluctuations would take on a somewhat cyclical pattern.

R Although reaches 1 and 2 are both riverine in character, projected habitat quality would change more in the first reach than the second (Fig. 10-9). This difference can be ascribed mainly to a lower proportion of existing disturbances to the streambed between Canon Perdido and Haley Street (reach 1), than the second reach where a considerable part of reach 2 has concrete on the bottom or against the sides and a comparatively uniform monotony of creek substrate. In effect, there is already less to degrade between Haley Street and the freeway so the same level of preventive hardening of stream edge and toe would cause a smaller reduction to habitat quality than it would upstream in reach 1. Similarly, periodic cleaning of the channel bottom would remove from reach 1 more features which contribute to its overall habitat quality than would happen in reach 2 where concrete surfaces and toe protection outweigh natural streambed.

R Comparatively little fluctuation would occur within the estuary, as well. Reach 3 seems to have come already to a steady state in which such stream bottom and toe protections as were once necessary have largely accomplished their purpose, and in part because stream currents slow down inherently as they begin to push against tidal influxes through this reach. Finally, the apparent equilibrium of seasonal deposition and then erosion of sediments in the estuary means no loss of habitat quality due to channel maintenance, which would not be required in reach 3.

Over the 50 years considered, average ecological values for reaches 1, 2, and 3 are projected to be 0.36 HU, 0.11 HU, and 0.19 HU, respectively. When added, they give a net value of 0.66 HU. These projections indicate a slight, and possibly negligible change from existing aquatic habitat conditions: 0.4 HU in reach 1, 0.13 HU in reach 2, and 0.20 HU in reach 3. Long-term decreases would occur in reaches 1 and 2, where periodic channel maintenance and more private investments in bank and creek stabilization are anticipated. The projected net decrease, 0.07 HU over 50 years, is slight and possibly would not even be perceptible.



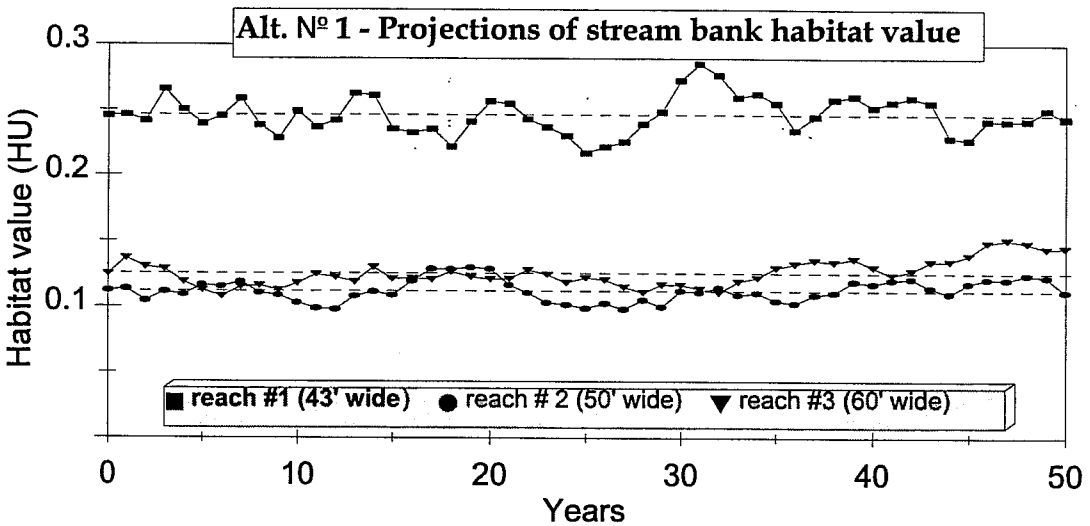


Fig. 10-9. Results of HEP analysis (Appendix C) which describe habitat values expected for the future without project. Aquatic habitat appears in the upper panel, stream bank habitat in the lower, and each panel shows how habitat units (HU) for each reach might change from year to year. Dotted lines are the average habitat value of each reach respectively over the 50 year period.

R **Stream bank habitat**: A similar pattern of fluctuations in stream bank habitat would be expected in the future if no flood control project were implemented. Removal of existing bank vegetation certainly occurs at times, especially when a property owner repairs existing revetments or elects to protect a length of natural stream bank beginning to erode. The largest fluctuations would be expected to occur in reach 1 (lower panel of Fig. 10-9), again where the existing banks are less disturbed compared to the wider reaches downstream. The amount of such clearance cannot be estimated realistically for any specific bank location. In fact, most of that vegetation removed for any purpose would soon reestablish itself, given the nature of this generally coarse and opportunistic growth, so any signs of all but the most recent removal would quickly be hidden by new growth. Indeed, most losses of existing stream bank vegetation would cause temporary effects, and would probably be regarded as negligible.

R During the life time of the proposed project, habitat quality of stream banks in reaches 1, 2, and 3 would average 0.24 HU, 0.11 HU, and 0.12 HU, respectively. Adding the averages for the three reaches gives a net value equal to 0.47 HU. The difference between that expectation and the current value, 0.48 HU, would be altogether insignificant.

R **Endangered species**: The timing of privately financed stabilization at a site on the creek is a matter of speculation, at best. Most likely, individual property owners along reaches 1 and 2 would make such alterations in the dry season of the year simply because the work would be less prone to weather damage. In the estuary, high tides driven by winter storms could conceivably damage existing revetments and repairs to them might be made immediately if regarded as urgent, or possibly later in the summer. Both necessities would have slight potential to affect both listed fish species: steelhead in the rainy season months, and tidewater gobies in the summer or fall.

Established procedures of channel maintenance by the County, if continued, would have no foreseeable impact to either steelhead or tidewater gobies. There would be no adverse consequences and no benefits to these Federally protected species.

Future large storm events of such a level as may require immediate preventative maintenance or repairs along the stream would also probably flush both steelhead and tidewater gobies entirely out of Mission Creek. Emergency maintenance or repair actions by private landowners or the County may conceivably affect steelhead which happen to have re-entered Mission Creek in the storm's aftermath. While a possibility, such an impact to steelhead would occur so infrequently as to be virtually unpredictable, and therefore not reasonably attributable to the No Action Alternative. Tidewater gobies would most likely have been flushed downstream to the lagoon, or beyond, by any storm event that would trigger such need. This species would not likely sustain any impact from emergency maintenance procedures.

R **The Moreton Bay Fig**: The dripline of the tree is about 200 feet from the closest private property, southwest of the tree and on the opposite side of the sandstone channel. Ornamental landscaping and private walls rise a few feet west of the channel's walls. Even if homeowners were to modify the back edges of their property completely, that physical separation and distance would preclude any genuine effect upon the tree. No sizeable vegetation of any kind grows on the left hand bank of the sandstone channel and, hence, could never be subject to periodic grooming by any entity.

R Maintenance by the County to clean sediments and vegetation from the sandstone channel would also occur at a substantial distance from the tree and major elements of its root system. Maintenance requirements for the banks along the sandstone channel would presumably not involve anything more than re-setting sandstone blocks along the existing alignment of its walls.

Adoption of the No Action alternative would cause no impact of any foreseeable kind to the Moreton Bay Fig.

10.4.3 **Alternative 12: 3400 CFS Capacity with Oxbow Bypass, Stabilized Sides Using a Predominant Combination of Planted Riprap, Vertical Wall, Habitat Expansion Zones, and Wetland Construction (Recommended Alternative)**:

10.4.3.1 **Impact Analyses**:

R **Aquatic habitat**: Implementation of Alternative 12 would necessitate excavation of the existing streambed in its entirety. During construction all existing physical features which give the creek bed its present character would be erased by removal of hardened surfaces, scour pools at the approach to bridges and where concrete placed in the creek has been undercut, natural sediments, all plants rooted in the streambed, and the instream fauna which cannot leave aquatic environs. These impacts would start near the lower end of the estuary, then progress upstream as work ends in successive portions of the project area. A hiatus of all construction activities in the creek bed would occur during the winter months, December through March, so the shift of impacts upstream would not happen steadily.

The degradation of aquatic habitat due to construction would be exactly equivalent to the existing habitat value of the future without project, namely 0.73 HU. Construction impacts cannot be avoided, but design features inherent in Alternative 12 and mitigation measures to be implemented (developed in §10.4.3.4 and 10.3.4.5, below) would negate these impacts entirely and render them effectively temporary in nature.

R Construction of toe walls, in part to shore up sloped banks where native trees and shrubs would be planted, would also physically and ecologically separate aquatic habitat from stream bank habitat. The HEP evaluation accounts for this impact by assigning lower habitat suitability indices to each individual structural mitigation feature than would otherwise be appropriate for them were this design to be built in a streambed without walls (see Table 10-6 and Appendix H).

Future maintenance of the flood control project will be necessary. In a way analogous to the need for periodic maintenance of the creek given the future without project — namely removal of sediments , obstructive growth of plants in the streambed, and accumulated debris — the project design requires maintenance as well. Unlike Alternative1, the recommended plan would allow as much growth of non-obstructive plants within the streambed as can be accommodated without interfering in achievement of the channel's design capacity. This procedure, termed a "mosaic pattern" of managing plant growth (please consult Appendix H, the Mitigation Monitoring Plan) preserves a portion of the habitat values which would accrue from one year to the next. Sediment removal will become necessary from time to time, as determined by weather patterns and local factors elsewhere in the watershed. Based on historic maintenance needs of the creek this should happen about every third year, on average. For Alternative12, the analysis of effects due to future maintenance assumes all the excess sediments and plants growing in them would be removed from the creek bed upstream from the freeway in those occasional years when the channel has lost at least 15% of its conveyance capacity. A cycle of aquatic habitat quality would mark Alternative12; rising when winter rains have not brought on the need to clean sediments from the channel and plant growth has been steady, but dropping sharply after the channel has been de-silted.

R **Stream bank habitat**: Implementation of Alternative 12 also would necessitate excavation which reaches the outside edge of the project's right of way. The recommended design depends on complete excavation of existing stream banks laterally from the current position of the toe to the limit of the right of way, expansion of the streambed, placement of channel walls, and filling and compaction of soils and similar materials to create the recommended combination of toe walls and vegetated riprap slope (Chapter 5, §A of the Main Report). Alternative 12 would cause temporary impacts associated with construction activities to stream bank habitat, aquatic habitat, and any wildlife present in the immediate area. It would remove virtually all existing vegetation on stream banks. The aggressive pest species, giant reed, castor bean, tree tobacco, and sweet fennel in particular, would thus be removed from the project reach. These impacts would gradually shift upstream as lower sections of bank and channel are completed.

R A portion of the native trees now growing along the banks probably would be removed during bank excavation, depending on detailed construction plans yet to be prepared. This loss would include a sycamore about half way between de la Guerra and Ortega Streets, part or all of the cluster of sycamores (3 trees, or a tree with 3 trunks) growing on the left hand bank upstream of Bath Street bridge, a coast live oak at Ortega Street bridge on the left, and arroyo willows and white alders at scattered locations. In total, between 12 and 15 extant trees have to be removed to accomplish the recommended design.

The degradation of stream bank habitat due to construction would be exactly equivalent to the existing habitat value of the future without project, namely 0.48 HU. Construction impacts of this level cannot be avoided, but design features inherent in Alternative 12 and mitigation

measures to be implemented (developed in §10.4.3.2-4, below) would negate these impacts entirely and render them effectively temporary in nature. Native trees to be planted would substantially offset the unavoidable loss of existing trees.

R **Endangered Species — Steelhead of the southern evolutionary unit:**

Construction between Cabrillo Boulevard and Yanonali Street. The most likely potential cause of adverse effects to steelhead will lie in the necessity to dry the streambed and toe of banks prior to construction. The plans for flood control construction would minimize this possibility through a combination of timing the work to give the best match to the life history patterns of steelhead migration, on-site monitoring for and supervised relocation of fish, and means to de-water only half the creek at any one time, thus always allowing steelhead unfettered movement in half the estuary. Nonetheless, netting and moving fish would affect them in a temporary and adverse manner. Please refer to the Mitigation Monitoring Plan for a summary of project related mitigation and monitoring.

Construction between the oxbow and Canon Perdido Street. Direct mechanical injury of fish or indirect but adverse effects such as impaired respiration caused by greatly increased turbidity could have impacts to steelhead while construction is underway in these upper waters of the project area. Measures to avoid or minimize unavoidable impacts include scheduling construction work outside the migration period, on-site monitoring for and supervised relocation of young salmonids encountered unexpectedly, temporary barricades at the upstream end of sections under construction to exclude smolt sized fish, or temporary use of a pilot channel through the current construction area screened at its upper end to block smolt-sized fish. Any fish netted and relocated would sustain adverse but temporary effects.

Routine channel maintenance. During winter storms, the creek presently scours pools at bridge abutments, e.g. the upstream side of that at Bath Street and that at Highway 101. These pools may persist through the dry season when sufficiently large and sheltered in the shade of the bridge itself. Although an unlikely event, young salmonids who get washed downstream before they are ready to swim to sea and are not yet strong enough to return to waters higher upstream would try to survive in such pools. As a precaution during the annual maintenance cycle, any young trout holding out in such refuges would be subject to supervised relocation. Steelhead netted and moved for their own well being would sustain adverse but temporary effects nonetheless.

R **Endangered Species — Tidewater goby:**

Construction between Cabrillo Boulevard and Yanonali Street. The most likely potential cause of adverse effects on tidewater gobies will lie in the necessity to build a temporary construction exclosure to dry the streambed and toe of banks prior to mechanical excavation. The scheme for flood control construction and its tentative scheduling would minimize this effect during the prime goby reproductive season through a combination of timing the work, on-site monitoring for and supervised relocation of fish, and means to de-water only half the creek at any one time. Nonetheless, netting and moving gobies in an approved manner would affect them temporarily and possibly adversely.

Release of tidewater gobies and other animals taken in seines from the drying exclosure into a suitable area, presumably of Mission Creek, may mean dumping assorted species together in quite unnatural densities and groupings of species. Until these refugees have dispersed, an unwitting interspecific melee could lead to gobies being confused and then eaten in numbers higher than would be typical.

Even after the water exclosure has been erected to dry half the creek, gobies would still have access to unrestricted water in the other half of the channel. However, it is conceivable that mechanical vibration originating from earthmoving equipment operating in the dry side of the exclosure could be transmitted through the ground and water. Such vibrations could be sufficiently irritating, or perhaps just sufficiently novel, as to dissuade gobies from swimming upstream past the construction area into higher reaches of the estuary, as they might be accustomed to do. Construction activities in the estuary could restrict their foraging to an area downstream of the vibration and potentially smaller in surface area of the bottom and overall volume than would otherwise be the case. That such a disruption of normal behavior may occur seems plausible. Should this happen, it would constitute an adverse effect on the population, although one of temporary duration.

Construction on the banks would remove what little vegetation now grows along the estuary. To the extent that plant growth provides important sources of food, e.g. aquatic insect larvae which themselves depend on nutrients washing into the estuary, removal of these plants could, perhaps, have a direct effect on the nutrition of gobies within the estuary.

Removal of existing shrubs between State Street and Cabrillo Boulevard may alter the microhabitat and behavior of gobies in this region of the creek. A change of this nature may be construed as having an adverse effect on gobies. The effect would also be temporary.

Design plans would leave the creek's channel wider than it is currently and confined between concrete walls whose surfaces are smoother than the existing spectrum of revetments. These structural changes could induce changes to flowing water, especially in the boundary layer where tidewater gobies might swim preferentially. Such potential changes in lotic characteristics of the creek could affect tidewater gobies adversely.

Construction between the oxbow and Canon Perdido Street. As construction during the second year of the project resumes upstream of the oxbow and then shifts steadily upstream from there, silt curtains will be deployed below the immediate area of construction to reduce suspended sediments in the water. In all likelihood, these fences probably will not trap all sediments and some will be carried downstream to the estuary. The distance over which untrapped sediments would have to travel and probably settle out (a minimum of about 1000 feet between the oxbow and Yanonali Street) before ever reaching the estuary should minimize effects on gobies. However, if sediment concentrations are still high by the time water reaches the estuary, gobies there could experience some impairment of respiration. This potential adverse effect should wane as mechanized work advances steadily upstream from the oxbow toward the project's upper limit.

Secondarily, silt fences may also trap potential food items that would otherwise wash downstream and become part of tidewater gobies' diet. A change in movement of organic detritus, also potentially attributable to silt fences located farther upstream, could starve insect larvae or snails which gobies normally feed on, thereby indirectly affecting tidewater gobies. Disruption of the food web in the estuary due to construction upstream which alters the movement of sediment and organic debris downstream may constitute an indirect effect to tidewater gobies in Mission Creek.

Routine channel maintenance. Once finished, the project will require annual maintenance to maintain design channel conveyance. Historically, fine sediments have never accumulated in the estuary to a depth which necessitates that they be removed. Larger runoffs during the winter months effectively remove all of the silty deposits which settle there during the summer and fall. Sediment budgets should not change appreciably with the project. As a result, no impact to tidewater gobies is anticipated from periodic maintenance procedures.

Building the recommended design for flood control on Lower Mission Creek probably will entail unavoidable and incidental impacts to both steelhead and tidewater gobies. However, design features inherent in Alternative 12 , mitigation measures and environmental commitments to be implemented (developed in §10.4.3.2-4, below) would result in substantial and permanent improvements of aquatic habitat value compared to the future without project. Mitigations proposed focus on microhabitat benefits for gobies, heterogeneity of stream flow conditions during upstream and downstream migration by steelhead, and overall aquatic habitat value. Effects of these mitigations and environmental commitments would fully offset the level of incidental impacts upon both fish species.

R **The Moreton Bay Fig**: The recommended design involves making an underground culvert to capture a major fraction of stream flow during flood events. The proposed underground bypass would be formed no closer than about 35 yards southwest of the tree's trunk. Following that alignment, a distance of 50 feet would lie between the tree's dripline on its

southwestern side and the edge of the bypass culvert. Small feeder roots very likely extend at least this far from the tree. Major trunks of its root system would not.

Alternative 12 would require construction passing through the tree's peripheral root system. Excavation to build this bypass would come no nearer the tree than about 60 feet beyond its dripline. Any root damage occurring at this distance from the vital parts of the tree would have negligible physiological effect to the tree itself. As a precaution, an arborist knowledgeable about the root systems of large ornamental trees, shall monitor the initial excavation for the box culvert. Any sizable roots severed during trenching shall be treated by trimming ragged ends smoothly and then sealing with a wound sealer for trees.

The box culvert would be constructed downslope from the tree. Neither the trench needed to install it, nor the finished buried culvert itself, would disrupt subsurface movement of water toward the tree's root system. The reinforced box could actually function as a buried sill and cause a small accumulation of soil moisture on the side toward the tree. In consequence, the fig may have a readier source of water toward the southwest during dry times.

No impact of any kind would occur to the Moreton Bay fig as a consequence of implementing the recommended alternative.

R 10.4.3.2 **Beneficial effects to aquatic habitat of inherent design features**

Hydraulic properties of Alternative 12 in regard to both endangered fish species: The proposed designs to accommodate runoff equal to 3400 ft^3/sec through this region of Mission Creek necessitate structural changes of the creek bed and its banks. In turn, these will bring about hydraulic changes when compared to existing conditions. The effects of structural changes — wider streambed, soft bottom of the streambed upstream from Highway 101 and downstream of Yanonali Street, a uniform gradient of that streambed, lower water velocity at any given discharge, a shift of sedimentary deposition upstream from where bedloads now tend to settle, walls to confine the creek channel and keep the banks in place, and a culvert to bypass the oxbow channel — have been analyzed with appropriate numerical models. The analyses, methods and assumptions, and results of those models may be perused in the other compendium to this EIS/EIR: *Final Hydraulics Documentation*, Appendix B of the Technical Appendices, September 2000. Interpretations of those results appear below in regard to microhabitat requirements of steelhead and gobies, typically as representative cross-sectional evaluations. However, these interpretations are not meant to substitute for those numerical results and the reader's attention is directed to that attachment for all relevant hydraulic information.

Wider Creek and Channel. Greater capacity of the streambed would come, in part, through lateral expansion by excavation of existing stream banks. Expansion of the creek's width would not be uniform throughout its length. Instead, different segments would be widened by different amounts (Table 10-1).

Table 10-1. Larger streambed as a result of flood control design						
segments bounded by streets	existing creek bed width (average)		planned creek bed width		% increase	
	feet	acreage	feet	acreage	feet	acreage
Canon Perdido to Haley Streets: (reach 1)	25 feet	1.22 acres	43 feet	2.10 acres	75% wider	72% larger
Haley Street to Highway 101 (reach 2)	25 feet	0.57 acres	50 feet*	1.06 acres	80 % wider, on average*	86 % larger, on average*
Yanonali Street to Cabrillo Blvd. (reach 3)	27 feet	0.69 acres	60 feet	1.54 acres	71% wider	220% larger
streambed habitat		**2.48 acres**		**4.70 acres**		**90% larger**
net change				**2.22 acres**		

Natural Bottom: At present, concrete has been placed on the bottom or along the sides of the creek over at least 33% (1820 linear feet) of the streambed, or as estimated by existing streambed area, on about 20% of that (*ca.* 0.52 acres/2.3 acres = 0.2). Estimates are conservative because more could well be present but unseen because sediments cover it.

All existing hardened bottom would be removed and replaced by native sediments throughout except within the historic sandstone channel and beneath bridges already built as box culverts. In total, approximately 4450 linear feet of streambed would be surfaced with native sediments. Incorporating the three distinct widths of the final design — 43, 50, and 60 feet — the proposed design would yield approximately 4.4 acres of streambed, and all this would be without any hardened surfaces, just soft, native sediments. This would amount to an increase of nearly 2¼ acres (Table 10-1) over the current size.

The native sediments which underlay Mission Creek would become the actual stream bed after all existing hardened surfaces have been removed. Subsequent aggradation of materials derived from the Santa Ynez Mountains, primarily cobbles and coarse gravels, would restore the bottom's native irregular and varied texture. Together with finer sediments lodged among them, invertebrates and herbaceous plants would benefit incidentally.

Longitudinal Streambed Profile: The streambed will have a constant pitch when completed, particularly at bridges. No discontinuities in the slope of the creek's channel will occur anywhere within the project, nor at the transition to the trapezoidal section of Mission Creek upstream from Canon Perdido Street (*Final Hydraulics Documentation*, Appendix B of the Technical Appendices, September 2000). In consequence of this design feature, steelhead will not confront drop structures of any kind from either direction.

Current velocity: The existing stream channel has considerable topographic variability in addition to being rather narrow on average. The lateral expansion coupled with restoration of soft bottom throughout would have the overall effect of slowing the water at any given discharge. Calculations from appropriate numerical models of the stream channel (*Final Hydraulics Documentation*, Appendix B of the Technical Appendices, September 2000, **HEC-RAS output**) were made at 50 foot intervals of measured stations. Among those, seven representative cross-sections have been selected to represent the general pattern. These seven happen also to be the cross-sections for which sediment deposition budgets were calculated, as well. By location, they are shown in Fig. 10-10.

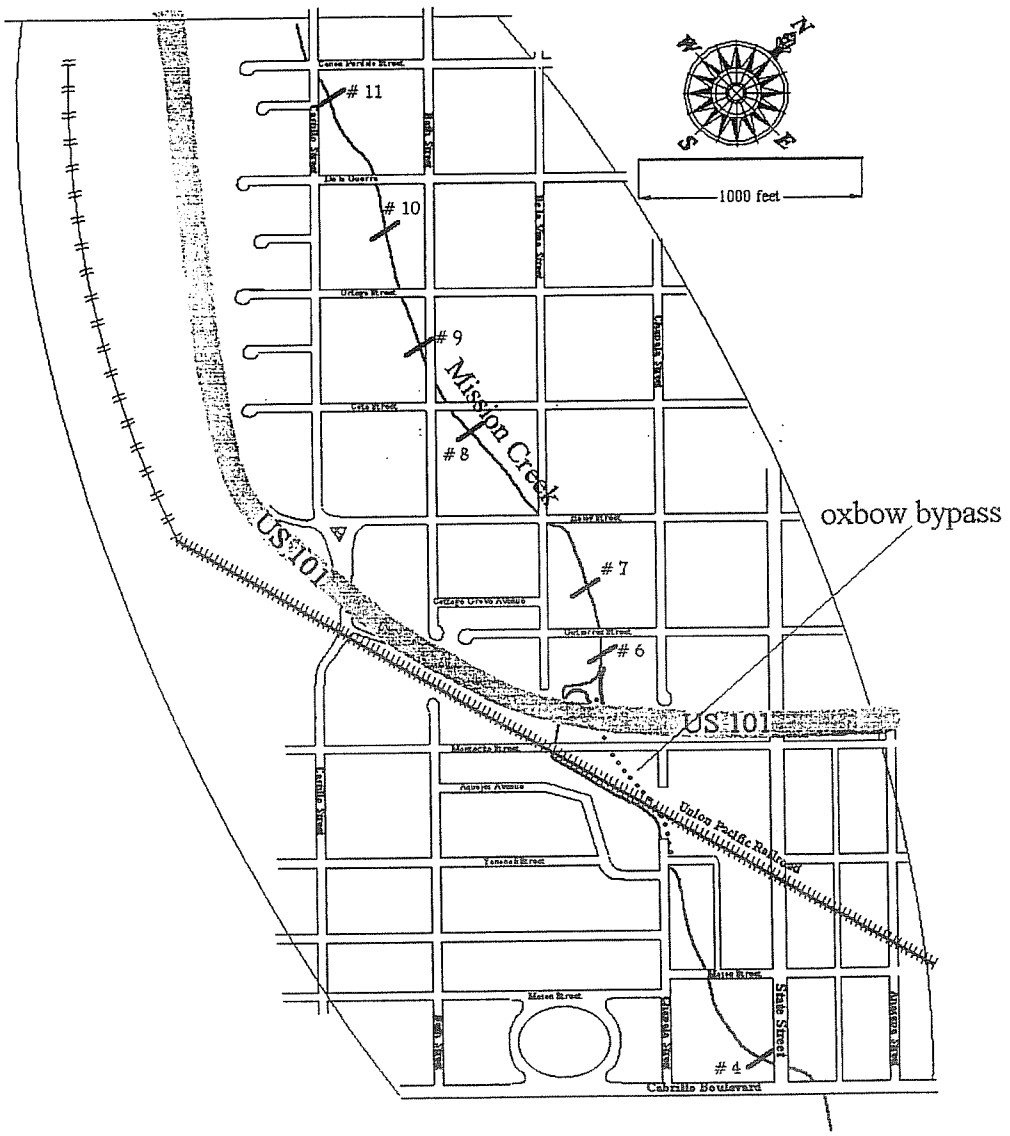


Fig. 10-10. Locations of seven typical cross sections used most currently to model hydraulic properties of the recommended design.

At two cross-sections, one of them in the estuary (4), stream velocity is expected to rise compared to existing patterns (Table 10-2). Water velocity in the center of the channel would double from about 2 to about 4 feet per sec, according to these calculations. At five of them, stream velocities are projected to be lower than the current conditions.

On average, stream velocity at a discharge equal to 640 ft^3/sec would by 95% of the current conditions.

Table 10-2. Water velocities as calculated (HEC-RAS model) for seven representative stream cross-sections.

	Velocity (ft/sec) of Mission Creek when conveying 640 ft^3/sec	
representative cross section	existing channel	proposed wider channel
11	4.55	6.88
10	8.14	6.17
9	5.15	3.42
8	10.22	4.68
7	5.57	4.38
6	9.37	4.38
4	1.92	3.89

Sediment Budget: Stream flow data recorded through the period of record (at USGS stream gage station Nº 11119750 on Mission Creek near Mission Street, approximately 1½ miles upstream of the top of the project) were analyzed by appropriate statistical techniques (HEC-1 Flood Hydrograph Package, see Hydraulics attachment) to give valid and comparable models of peak and average daily flows. Such numerical models, called balanced hydrographs, then were applied in conjunction with the specific hydrograph of the record flood (that of January 10, 1995 when peak discharge reached 5200 ft^3/sec and the 24 hour average discharge was 1400 ft^3/sec) to calculate projected movement of sediments.

Each calculation (Table 10-3) pertains to a single storm event, even though the present and future needs to remove sediments arise from net aggradation from the sporadic patterns of individual storms over a period of time. Projections for sediment movement at seven representative cross-sections (Fig. 10-10) have been derived at three representative levels of discharge. In a harsh year, the sediments from many storms could trigger repeated maintenance

cycles within certain reaches of the creek. On the other hand, several mild winter seasons may come and go without need for any maintenance of the streambed.

Table 10-3. Anticipated pattern of sediment deposition or erosion at seven cross sections on Lower Mission Creek. Results come from numeric modeling of sediments budgets based on balanced, synthetic hydrographs for each of three flow conditions. All results are in units of cubic yards (yd^3) and represent the expectation of sediment movement arising from a single storm event whose peak conveyance corresponds to either the yearly average event for Mission Creek (640 ft^3/sec), a storm event that occurs on average once every 5 years (1470 ft^3/sec), or a storm event that occurs on average once every 20 years (3400 ft^3/sec). Columns headed 'current' and 'designed' show sediment patterns for the existing conditions and the proposed flood control project, respectively. The columns headed 'difference' show how sediment patterns would change as a result of the project.

Cross section	net effect	640 ft^3/sec discharge			1470 ft^3/sec discharge			3400 ft^3/sec discharge		
		current	designed	difference	current	designed	difference	current	designed	difference
11	erosion	-333	-1850	-1517	-939	-5081	-4142	-2683	-14155	-11471
10	deposition	-820	1348	2168	-2075	3691	5767	-5305	10251	15555
9	erosion	252	-297	-549	599	-1384	-1983	1425	-5862	-7287
8	deposition	383	483	100	1061	1892	831	2973	7268	4294
7	deposition	-1181	185	1365	-3237	513	3750	-8991	1444	10434
6	erosion	592	-56	-648	1624	-111	-1736	4518	-198	-4715
4	erosion	581	-313	-895	1594	-928	-2522	4422	-2773	-7196
net difference				25 yd^3			-35 yd^3			-385 yd^3

Sedimentary regimes are predicted to change most at cross-sections 10 and 7. In both locations, the current erosive pattern would shift to one of net deposition. The opposite kind of change, from a current depositional pattern to one of net erosion during a storm event, would characterize three cross-sections. For example, storm events would be expected to remove silts and fine sediments from the estuarine section of the creek, cross-section 4. A similar change to net erosion would occur at cross-sections 9 and 6, both upstream of Highway 101.

To the extent cross-section 4, an arbitrarily chosen location, typifies the changes expected throughout the estuary construction of the project would reduce the bedload of fine sediments carried in. The substrate in the estuary may come to have a more gravelly and rocky texture throughout on a permanent basis. If so, tidewater gobies may actually have an expanded spawning area as a result.

The change from existing conditions to design conveyance capacity would alter the net sediment budget for the entire project very slightly. A net total of 25 yd^3 should accumulate each

time the creek carries an average storm event. In contrast, individual higher peak flows should promote net erosion from the streambed, 35 yd^3 during a 5-year storm event and roughly ten times that quantity removed during a single design event.

R 10.4.3.3 **Beneficial effects to stream bank habitat of inherent design features**

The recommended alternative makes ecologically valuable use of banks along the creek by two means. The first combines a slope on which native plants would be set out with low, vertical walls at the foot of the banks to confer the desired flood control protection and conveyance capacity, and which makes a setting where species native to coastal riparian habitat may prosper along much of Lower Mission Creek. The second makes use of small parcels of property contiguous with the top of the design banks for areas in which to plant additional native trees and shrubs, so called habitat expansion zones.

Combining toe walls, sloped banks stabilized by riprap, and native species:

Lower retaining walls, so called toe-walls, would be built as tall as half the height of the existing bank top in most places along the creek. Existing banks will be excavated to a lateral distance of 11 feet beyond the alignment of toe walls. Excavations would extend approximately 6 feet below existing streambed grade, to facilitate construction of the footings for and the channels themselves. Once toe walls have been completed, native materials would be placed in lifts and compacted between the wall and carved banks. Above that wall, the rising banks would slope away from the wall and toward the top of the bank, following an incline not steeper than a rise of 12 inches in height for every 18 inches of lateral distance (1½: 1, H:V). A layer of aggregate rock, angular and ¼ to ½ inch in size, would be placed above the native soils and compacted to a thickness of approximately 6 inches. The finished slope would be protected from erosion by a layer of riprap composed of intermeshed angular stone, 15 inches in size set directly onto the filter stratum. Native top soils wiggled into the joints between stones, and a 6 inch layer of native soil atop the rip rap would be amended as necessary to accommodate all plantings, based on an analysis at the time of concentrations of soil nutrients.

Wattles of arroyo willow cuttings taken from local sources would be laid into furrows cut into the stratum of native soils beneath the filter layer (Fig. 10-11). Only a fraction of willows set out as wattled branches beneath the filter layer and riprap would sprout vegetatively and find their way through gaps between rocks. In the expectation of 5% to 15% successful vegetative propagation of willows, wattles need to be planted in excess so that some will emerge every 15 feet, or so.

Larger planting cylinders 3 feet in diameter and scored to promote eventual breakage will be set through the riprap and filter layers and filled with suitable topsoil to provide a direct route to the compacted soils of the new banks. These cylinders will accommodate canopy trees of 1-gallon stock. Smaller planting cylinders (12 inches in diameter) will be placed between the

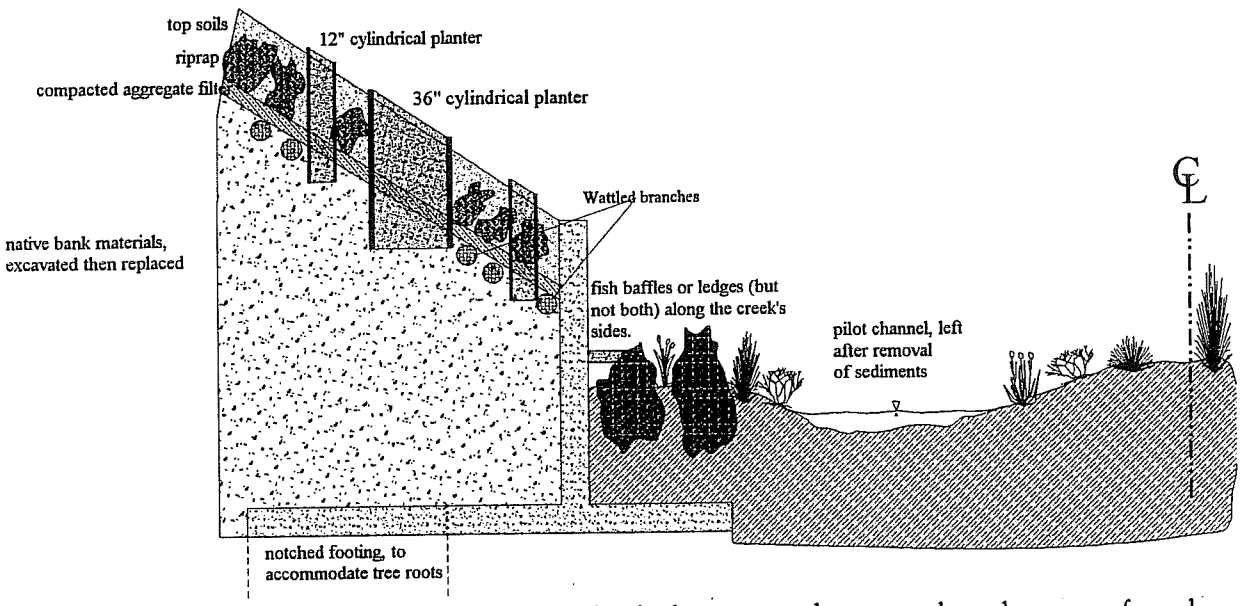


Fig. 10-11. Arrangement of four layers of materials which compose the riprap slope, location of wattles beneath the aggregate layer, planting cylinders, toe walls and inverted "T" -footing, side baffles, fish ledges, and pilot channel of the recommended design. Native stream bank vegetation to be planted into the riprap slopes is not depicted. All elements of the design are shown approximately to scale for the 43' wide reach of the project.

larger cylinders and scattered about the slope. Some of these smaller planters would receive willows already from cuttings of locally available sources, and others would have native upland shrubs (from 4 inch liner stock) as agreed upon by resource agencies. These tree species would eventually break the planters apart as their trunks expand and the trees begin to attain proper stature.

Most would be planted out from 1-gallon nursery stock because smaller trees establish much better root systems compared to trees reared until they reach large container sizes, e.g. 15 gallon. At conspicuous places, a few larger trees could be planted for their immediate ornamental effect. They would be spaced 40 feet apart, in the expectation that their crowns would converge and create a bona fide canopy. Openings through the foundation of the channel walls which would allow root systems to grow downward to the full natural depth of native rock and soils cannot be placed closer together than 40 feet, hence that final spacing of trees. Where design considerations allow, clusters of trees would be planted together.

R Several western sycamores currently growing along Lower Mission Creek probably germinated during the 19th century, to judge by their stature and girth of trunks. These

individuals quite possibly represent a historical collection of genes which proved adaptive prior to extensive urbanization. In particular, the solitary tree just below de la Guerra has attained enormous size and would seem to be exceptionally healthy. A large sycamore on the right hand bank between de la Guerra and Ortega Streets grows too close to the stream that is probably cannot be preserved during construction. Finally, a cluster of trees at the Mason Street bridge are noteworthy because they evidently tolerate higher salinity than is typical of sycamores. Every effort would be made to establish an abundant nursery of sycamores for the entire project area by rooting cuttings from these notable trees. Progeny of the Mason Street cluster would be planted close to the estuary. Vegetative clones from the two trees near the upper end of the project would be used down to the oxbow. Failing successful establishment of cuttings, fruits should be gathered from these various trees and as many seedlings germinated from them as space allows in a local nursery. Should horticultural skills yield a great wealth of sycamores, the bounty could certainly be planted elsewhere within Santa Barbara.

Structural design of toe-walls would incorporate a large opening into the footing at intervals of 40 feet. Canopy trees would be planted directly over these openings, allowing their root systems to reach native soils and subsurface water below the excavation limits within 2 to 3 years.

Additional stocks of native shrubs shall be planted directly into the topsoil compacted into spaces between riprap stones. The final surface would then by hydro-seeded with an appropriate mixture of annual and perennial native grasses as well as upland shrubs appropriate to this climate and location.

With time, a canopy of large trees and an understory of appropriate species should grow into a semblance of a native riparian corridor along both sides of Mission Creek. Principal species which would be planted include native trees that form characteristic canopies of foliage, and lower growing perennial plants that form the lower layers of foliage and stems, including:

Canopy forming species	**Understory species**
western sycamore (*Platanus racemosa*)	Arroyo willow (*Salix lasiolepis*)
Fremont's cottonwood (*Populus fremontii*)	holly-leafed cherry (*Prunus ilicfolia*)
black cottonwood (*P. trichocarpa*)	coyote brush (*Baccharis pilularis*)
coast live oak (*agrifolia*)	Mexican elderberry (*Sambucus mexicana*)
white alder (*Alnus rhombifolia*)	blackberry (*Rubus ursinus*)
California bay (*Umbellularia californica*)	

Appropriate native perennial and annual grasses, small perennials, annuals and forbs would be applied over the finished surface. Whether broadcast by hand or applied as a hydroseed slurry followed by a hydomulch and in appropriate combination with some type of fiber blanket such as woven coconut or jute to suppress erosion, methods to plant these components would be determined when final architectural landscaping plans would be drawn up later during PED.

A temporary, above ground drip irrigation system would sustain all plantings through the initial years' dry seasons, until plants become established and root systems fully capable of providing water and nutrients from these soils below the riprap. Its use would probably be restricted to dry months of the year. It is anticipated that these plantings would need supplemental irrigation for 3 to 5 years.

Planted riprap slopes would be built primarily above Highway 101. In total, 4740 linear feet of riprap bank would be created, 65% of the total length of available banks (7250 linear feet). In nearly all locations, this design creates a plantable corridor slightly more than 11 feet wide, so the proposed project would install 1.2 acre of stream bank corridor (52,140 ft^2). Space for a minimum of 118 native trees would be created by the placement of riprap on both the left and the right slopes above the creek's channel. Architectural drawings (Exhibit 8 of the Main Report) shows the location of planted riprap slopes. Cross-sectional drawings also show the expected appearance of banks planted with native canopy forming trees after some years have passed and trees begun to attain some size.

R **Taking advantage of no need for toe walls**: A location already within the stream's channel allows a greater number of trees because toe walls are not required for structural integrity. Instead, a riprap slope would be built directly to the water's edge. This site makes up both banks of the oxbow just downstream of the planned opening of the bypass culvert and just before the creek turns under Highway 101. Approximately 325 linear feet of creek bank on both sides would be finished as riprap side slopes (sheet 15, Exhibit 7 and sheet 4, Exhibit 8 of the Main Report).

The continuous riprap slope imparts an ecologically valuable attribute to this location. Trees may be planted through the riprap virtually down to the water's edge. This arrangement would promote formation of root masses at the creek's edge and other intangible ecological links between creek and banks. White alders would be more suitable in this setting than above toe walls. At a minimum, 40 trees could successfully be established on these riprap slopes.

A moderately large sycamore already grows on the left bank, and would be among those natives not disturbed by construction. The isolated bit of land it's on would become an island, in effect, cut off by the box culvert to the east, freeway to the south, and the existing low flow channel to be retained to the west. After allowing for the area of riprap side slopes on this island, about 2200 ft^2 additionally would be suitable for planting on this island of stream bank. At a minimum, 25 trees could be established in the interior.

This location alone would sustain approximately 65 native trees. Understory vegetation would be included, as well.

R **Habitat expansion zones on the overbank**: The alignment of the creek combined with toe walls, their footings, and sloped banks above the walls require a construction right of way which will pass through some private properties (enumerated in Chapter IV, §G of the Main Report). Not all of the land acquired for this purpose in each parcel would lie within the

construction limits, however. Remnants of these parcels would be used to enlarge the areas along the creek's banks planted with native trees and shrubs. All would nominally be constructed at the top of the banks and extend back away from the creek as the shape and size of each parcel allows. These habitat expansion zones (Table 10-4) would afford places to expand the planting of native trees and shrubs which maintain continuity with natives planted on the slopes (locations shown on sheets 13 - 16, Exhibit 7 of the Main Report).

Table 10-4. Habitat expansion zones to be constructed adjacent to Lower Mission Creek where trees and arborescent shrubs native to the Santa Barbara area and adapted to riverine conditions could flourish. Species intended to form a canopy when mature would be planted from 1-gallon stock, irrigated during the dry months for 2 to 3 years, and replaced in kind should any die during the first 5 years after completion of the flood control project. Species planted in each site include western sycamore (*Platanus racemosa*), cottonwoods (*Populus fremontii* and *P. trichocarpa*), coast live oak (*Quercus agrifolia*), California bay (*Umbellularia californica*), wax myrtle (*Myrica californica*), holly-leaf cherry (*Prunus ilicifolia*), toyon (*Heteromeles arbutifolia*), and possibly white alder (*Alnus rhombifolia*).

location, numbered moving downstream	area for planting (ft^2)	trees established after 5 years	other remarks
1) adjacent to Castillo Street	6035	60	vacant lot next to the side walk; at existing grade
2) between Ortega and Bath Streets, left bank	2025	20	residential; at existing grade
3) just below Haley Street, right bank	700	8	residential; at existing grade
4) just above Mason Street, left bank	1950	20	currently vacant property
5) just below Mason Street, left bank	450	5	commercial; grade level here is only slightly above stream level

R All the vegetation planted into habitat expansion zones would be cared for with the same regularity as the planted riprap slopes (details in Appendix H). In total, the five habitat expansion zones should yield a minimum of 113 trees well established after 5 years.

R An additional parcel adjacent to the creek on the right bank at the oxbow presents an opportunity to construct a sixth habitat expansion zone. It is currently vacant. The western part of it is essentially contiguous with Highway 101 (sheet 7 of Exhibit 7, Main Report). During construction of the freeway, CalTrans acquired this property and used it as an equipment staging area. It forms the right hand bank of the upper part of the oxbow. Because of its proximity to the streambed and topographic suitability for enlarging the creek into the right bank, the site was discussed as a potential wetland and habitat expansion zone in the DEIS/EIR. However, a substantial contingency affects the property. Prior to its acquisition by CalTrans a commercial

dry cleaning business occupied the location (Section 15of the EIS/EIR). Over the years perchloroethylene used in the dry cleaning process leaked from holding tanks into the soils. Presence of that organic solvent beneath the surface means any potential use of this land for habitat expansion or other environmental aspect of the recommended alternative must be deferred, at least temporarily. If that contaminant can be cleansed from the soil in the future, then environmental plans for this location may reasonably be pursued. This current evaluation speaks only to future opportunities for this property; it does not enter into the accounting for beneficial effects of inherent design features. Neither can it counted among the components of mitigation, below.

R **Tally of canopy forming trees to be installed**: All vegetation, trees and shrubs alike will require supplemental water and periodic maintenance if they are to succeed. Plans to fulfill these maintenance needs are the subject of Appendix H, and intentionally not duplicated here.

In total, approximately 290 native trees would be planted, counting all those along the riprap slopes, the unique area at the oxbow, and the five habitat expansion zones. Assuming a minimum of 90% survivorship over a 5-year period, approximately 260 trees should remain and these would be in the early stages of healthy maturity.

R 10.4.3.4 **Mitigation of unavoidable impacts to steelhead and tidewater gobies**:

Since publication of the DEIS/EIR, several agencies have discussed with the Corps of Engineers a number of important considerations during construction of the recommended alternative, its functional design properties and how these might adversely affect these endangered species, and details of maintenance. Alternative 12 now includes explicit mitigation features, developed below, and a less austere plan for periodic maintenance of the creek during its operational phase. Both aspects actually confer net benefits on aquatic habitat directly. Indirectly, habitat improvements would benefit both fish.

All impacts to either steelhead or tidewater gobies would be of a temporary nature. The project would not permanently reduce net reproductive rate ($R_0 \approx \int l_x m_x dx$), age-specific survivorship (l_x), age-specific fertility (m_x), or dispersal ability of either species. Incidental take is likely to occur despite environmental commitments (developed in Section 10.4.3.5, below) however, so mitigation is appropriate. Broadly, these elements would improve habitat conditions for both species. They are summarized in the following table (Table 10-5) and more detailed descriptions follow that.

Table 10-5. Structural features which each partially mitigate for adverse effects to steelhead and tidewater goby. Indirect benefits come about by raising the quality of aquatic habitat in the estuary or the riverine portions of the project area.

	direct compensatory benefits		indirect compensatory benefits	
Project feature	steelhead	tidewater goby	in-stream fauna	movement of water
soft bottom	natural sediments create rough surfaces which ease upstream migration	more bottom surface as foraging area	promotes larger invertebrate populations	lower runoff velocities
expanded estuary	larger area where smolts can bide their time just prior to entering the ocean	greater water volume to hide from predators		
ribs on estuary walls		a boundary layer refuge of lower velocity and eddy currents		no reduction of channel conveyance
horizontal ledges on estuary walls	sheltered overhangs as resting places	shelter from predators		no effects on channel conveyance
fish baffles on estuary walls	hiding places for smolts	hiding places	many species prosper in these varied microhabitats	no effects on channel conveyance
in-line and side weir at oxbow	prevents flows from entering culvert when steelhead could be present			divert all flows ≤ 640 ft^3/sec through existing watercourse
mid-stream boulder clusters	create heterogenous flow regimes and resting pools		varied microhabitat conditions would favor many species	absorb momentum of strong flow regimes
horizontal ledges on riverine walls	sheltered resting spots		promote scour pools where water persists through dry months	no effects on channel conveyance
fish baffles on riverine walls	turbulent and varied flow regimes during migration		varied microhabitat conditions would favor many species	no effects on channel conveyance
permanent pilot channel linked to fish ledges	direct low flows toward pools scoured beneath ledges		complex instream fauna could persist year-round in predictable water.	optimize course of flows during the late spring, summer and fall

By their design, each of the proposed mitigation features is intended to add a small increment of habitat worth to offset unavoidable adverse effects to tidewater gobies and steelhead. These features would individually restore a small portion of overall habitat quality to a streambed that would, in their absence, be wider and basically flat all the way across, and lack for varied surface features which cause heterogenous flow conditions.

The respective contribution of each feature was pegged lower than could be accounted for in a similar application, but where structural walls do not intervene directly between the stream and plants growing at its edge on the banks. In effect, toe walls of the recommended Alternative would impair the ecological link between aquatic and stream bank habitats and aquatic habitat values are deliberately lower to account for that reason (please refer back to §10.4.3.1). They were allotted a habitat suitability index (please refer to the Revised HEP analysis, Appendix C), as indicated (Table 10-6).

Table 10-6. Increments of habitat suitability index (HSI) assigned to separate mitigation features that constitute part of the project design for Alternative 12. Any segment of the creek bed where a mitigation feature would be applied would be judged higher in habitat quality by the amounts shown.

MITIGATION FEATURE	VALUE AS HSI	LOCATION WITHIN THE PROPOSED PROJECT
removal of concrete	0.05	scattered throughout all three reaches
side baffles	0.05	reaches 2 and 3
fish ledge and protected scour pool	0.15	reaches 2 and 3
fish ledge below ordinary high water mark	0.075	reach 3 (Mason Street to Cabrillo Boulevard)
ribs and side baffles together	0.075	reach 3 (Mason Street to Cabrillo Boulevard)
mid-stream clusters of boulders	0.25	reaches 1 2
pilot channel (& reconstructed after removal of sediments)	0.075	reaches 1 2

Fish refugia in the estuary. Permanent and durable mitigation features to create hiding places where fish may take refuge would be composed from three separate structural elements by forming coarse surface relief of the walls, artificial overhangs projecting from the walls, and placing double rows of coarse boulders between the overhangs along the walls of the estuary. In combination, they should provide shelter for fish of all sizes.

High-relief surface ornamentation where gobies and other small fish could escape strong currents would be made in a pattern of slanted ribs. Each would be molded as a parallelogram to stand 3 inches proud of the wall surface, 4 inches wide, and whose downstream face would form an acute angle to the wall. Nineteen inches would separate one from the next (shown in detail on Sheet 4, Exhibit 8 of the Main Report). These molded ridges would extend from the

ordinary high water mark to the bottom of the formed wall, roughly eight feet in vertical length. Most of the time water in the estuary would cover them completely and each would extend well below the streambed. Lower velocity and localized eddy currents would exist around these ribs, primarily caused by the effects of protruding ribs on the boundary layer adjacent to the wall itself. Small fish the size of gobies would easily find the recesses on their downstream side and take advantage of the refugia from currents created by these mitigation structures.

The second component of structural mitigation features, these intended primarily for steelhead and other large fish, would consist of projecting ledges. Ledges would jut perpendicularly from the wall 2 feet into the flow, be 6 inches thick, and roughly 50 feet long typically. Within the estuary, jutting ledges would be built at varying heights, say 10 to 20 inches, above the invert of the streambed and substantially below the ordinary high water level. Water would cover these ledges at all except the lowest low tides and all fish could easily swim beneath them.

The space between successive projecting ledges allows a third mitigation measure: boulders of sufficient weight to stay in place against the velocity of design events, approximately 8 ft/sec (*Final Hydraulics Documentation*, Appendix B of the Technical Appendices, September 2000). A double row of large, angular rocks would be nestled together and placed against the wall at the foot of the ribs. Ranks of boulders would extend into the creek about 5 feet from each wall. The innumerable crevices, voids between rocks, and spaces between rocks and the wall itself formed in this orderly jumble would provide thoroughly natural habitat for small fish and invertebrates. A fraction of those spaces should prove large enough for steelhead smolt also to find shelter amongst the rocks

Ribs, boulders, and ledges would line both sides of the estuary between Cabrillo Boulevard and Mason Street. All surfaces in this section of the project would have all three features intermixed, although a ledge on one wall would face ribs and boulders on the opposite wall. Lengths of the walls allow 380 linear feet of fish ribs and boulders and 240 linear feet of overhanging ledges on the left hand side; 360 linear feet of fish ribs and boulders and about 300 linear feet of ledges on the right-hand side.

Locations in the estuarine portion of Mission Creek where ribs, boulders, and ledges would be built are shown in the Engineering Plans (sheets 21 and 21, Exhibit 7 of the Main Report).

Hydraulic considerations of the overflow culvert and oxbow channel: The design capacity, 3400 ft^3/sec corresponds to a storm event that occurs once every 20 years on average, and requires a means to convey water past the most constricted portion of Lower Mission Creek. That constriction exists at bridges within the oxbow portion of the existing channel. Currently, water spills out first at the Montecito Street Bridge and the railroad bridge immediately downstream of it. The project incorporates a box culvert to carry the bulk of storm events.

The culvert will extend between the upper end of the oxbow and the Yanonali Street Bridge. The culvert and the existing watercourse will reunite immediately below that bridge.

Design of this feature will lead all flows equal to or smaller than 640 ft^3/sec through the sandstone diversion channel, i.e. the existing course for Mission Creek. The design will not constrict in any substantive way the route water currently follows through the oxbow and sandstone channel.

When runoffs surpass that volume, the design will begin to divide storm flows into two paths by engaging the bypass culvert at the same time as directing some additional water (in excess of 640 ft^3/sec) to follow the existing path to the ocean. Volumes up to1050 ft^3/sec will be entrained through the oxbow and sandstone channel, just as they currently flow.

In actuality, the existing watercourse and the culvert must function as paired alternative channels which accomplish two separate needs. First, the existing oxbow must behave as the sole channel for all discharges less than the yearly average event (640 ft^3/sec, a recurrence interval of 2.3 years), i.e. the culvert cannot begin to accept any water until flows exceed 640 ft^3/sec. Secondly, when discharges exceed that threshold the water's momentum must carry it toward the culvert preferentially and away from the oxbow to counteract the existing route's tendency to take on flows in excess of the limiting conveyance capacity, i.e. flows larger than 1050 ft^3/sec must be captured by the culvert. At the design limit, the culvert will shunt as much as 2350 ft^3/sec past the existing channel while 1050 ft^3/sec pass through the oxbow.

This switching hydraulic property of oxbow and culvert can be achieved by construction of a weir which combines both lateral and in-line elements arranged in a direct line with the current and the entrance to the culvert. The plan drawings (sheet 23, Exhibit 7, and sheet 9, Exhibit 8 of the Main Report) depicts its length, width, cross-sectional profile, and combined lateral and in-line characteristics of the surfaces which establish the threshold at which water begins to enter the culvert. Based on numerical solutions (*Final Hydraulics Documentation*, Appendix B of the Technical Appendices, September 2000, HEC-RAS output), it would need to be slightly taller than 3 feet to have an operational threshold of 640 ft^3/sec and approximately 240 feet in length to accommodate discharges in excess of 1050 ft^3/sec, the capacity of the oxbow channel. Further refinements of design criteria for the weir could emerge later during the Project Engineering Design phase (PED). Any such refinements would also incorporate recommendations from hydraulic evaluations by NMFS itself.

The lateral portion of the weir complex which would extend toward the Gutierrez Street Bridge would occupy about 22 feet (to the outer side of the structure) of the finished design width of the stream bed itself, 50 feet wide (sheet 23 Exhibit 7 of the Main Report). The difference, about 28 feet, would be creek bed with natural bottom. The existing stream bed along this specific portion of the creek tapers over a distance of about 125 feet from 35 feet wide (10.8 m as measured May 4th 2000) immediately below Gutierrez Street to about 22 feet. In the next 75 feet it widens again to approximately 27 feet. Thus, construction of the side portion of the weir can be achieved with no restriction compared to the existing streambed width. Water velocities adjacent to the weir are projected to range between 4.39 and 1.88 ft/sec at a discharge equal to 640 ft^3/sec (Hydraulics appendix, HEC-RAS output). The existing streambed passes flows through this constricted point at more than twice that speed, 9.37 ft/sec. Since the soft-

bottom portion of the creek would be wider than the existing conditions than with the lateral weir in place, the weir would not increase water velocities through this region of the creek, before water starts to pass over the weir. Indeed, water velocities between Gutierrez Street and the start of the oxbow should be substantially lower than occur now.

The downstream end of the culvert would be at grade level, and the streambed here armored by riprap to prevent scour below the culvert. Before the controlling weir begins to pass water into the culvert and thus create a current through it, flows down the existing channel will back up into the culvert from the bottom and create a static pool of variable length depending on the discharge at the time.

Mid-stream boulder clusters: Baffle structures the full width of the streambed and 300 feet in length would combine clusters of large boulders and fields of riprap at two locations, the two separated by about 2350 linear feet of streambed. One boulder cluster would be built centered on the Gutierrez Street bridge, and the second would be centered about the de la Guerra Street bridge (sheets 23 and 25, Exhibit 7 and sheet 9, Exhibit 8 of the Main Report).

Stone used for riprap would be as large as15 inches in diameter and of angular character. Larger boulders, essentially individual derrick stones of 3 to 4 feet diameter each, would be set down into the surrounding riprap, placed 5 to 8 feet apart, and arranged in clusters of 6 to 9 individual boulders. Tips of the rocks would protrude 1½ to 2 feet above the streambed.

The boulder patches would constitute islands of very coarse and permanent streambed irregularities. Upstream of them, Mission Creek would tend to flow as a homogenous, single current. By their placement, these clusters ought to disrupt that flow regime and induce smaller and intertwined subcurrents. These many smaller currents should continually reshape the longitudinal profile over the length of the baffles fields and downstream of them for some way.

Each cluster of boulders would naturally form various internal cross currents and protected patches of water. Placement of clusters within the baffle field is intended to promote the variety of water conditions trout seek out in natural streams, so clusters would be placed to outline a sinuous and meandering predominant channel, one that shifts back and forth across the streambed.

Ledges upstream of Mason Street. Overhangs, of like design to those which form part of the fish refugia along the estuary walls, would be placed along the riverine sections of the creek (including the length between Mason and Yanonali Streets, otherwise treated as the upper end of the estuary) where currents should impinge against the wall and scour persistent holes under these ledges. Adult steelhead would have access to these pools during upstream migration. All manner of aquatic animals would take advantage of these sheltered pools throughout the dry season.

Walls on both sides of the creek would have them, placed as indicated by current patterns (sheets 24 and 25, Exhibit 7 of the Main report). Four would be built along the left hand side

(approximately 200 linear feet, in total) and five constructed against the right hand side (total of 250 feet in length).

Fish baffles upstream of Mason Street: Arrays of large boulders placed to the inside of walls would impart diverse flow patterns and a valuable measure of aquatic heterogeneity, lacking which the creek's streambed would mostly resemble an unrelentingly flat surface characterized by steady sheet flows. Their mass and position adjacent to the wall, and thereby within the boundary currents inherent to sides of the channel, would minimize the incidence of currents dislodging them.

Each baffle would consist of a rank of large rocks or derrick stone placed touching the inside surface of the walls, with a second rank inside the first and closer to the creek. Rocks would stand proud of the streambed by 18 to 24 inches. Together, the two ranks would extend inward toward the creek approximately 5 feet. A space of 5 to 8 feet would separate individual rocks, or perhaps pairs of boulders, to facilitate periodic removal of sediments from between them.

Fish baffles would occupy locations in lower velocity sections of the creek, on one side or the other as appropriate to its curvature. In certain lengths of the creek side baffles would be placed along one side only, then for another length be built against the opposite side. Many baffles would extend along 150 feet of the creek's side, a few up to 200 feet in length, while others would be shorter by necessity. Design restrictions prevent their placement beneath bridges, for a certain distance on the upstream side of bridge abutments, and directly opposite other baffles or ledges.

The creek's channel allows fish baffles to be interspersed with ledges as indicated by the prevailing direction of currents and streambed to encourage formation of varied stream features (sheets 24 and 25, Exhibit 7 of the Main report, and Fig.10-12). Side baffles would be installed over approximately 1400 linear feet of the stream's edge; 675 linear feet of fish baffles on the left and 725 linear feet on the right side.

Pilot channel as permanent low flow path: The project's design for the creek's invert includes scoring a pilot channel into the bottom as the last element of construction. Otherwise the streambed would be a uniformly flat expanse of native sediments between the toe walls. This pilot channel would constitute a permanent component of the instream habitat between Canon Perdido and Highway 101, although one possibly given to positional shifts as the finished creek bed evolves. No pilot channel would be fashioned into the creek bed below Yanonali Street. Between Yanonali and Mason Streets periodic tidal ebb and flow would largely negate the intended purpose of such a channel, and below Mason Street the tidal movements would very quickly make it thoroughly ineffective.

Initial alignment of the pilot channel would be planned in accordance with positions of fish ledges. Indeed, both mitigation features would be planned on the results of detailed

hydraulic analyses, to be completed during PED. Fish ledges would be constructed at the outside of bends of flow patterns to insure water impinging against them and thereby scouring persistent pools beneath them. Close to ledges, the pilot channel would be aimed toward them. In the reaches between ledges, the pilot channel would be aligned to follow the bank-full path which the stream would tend to establish on its own. Whether or not the pilot channel would best follow a serpentine or relatively straight path between successive ledges cannot be determined until completion of the hydraulic analysis.

A pilot channel large enough to carry at least 50 ft^3/sec would be adequate to carry water along the preferential innate course. Its physical size and shape would also be determined after final hydraulic analyses, but would probably be trapezoidal in appearance and 8 to 10 feet wide by 1 to 2 feet deep. Such a configuration would be intended to carry the low flows which typically move down Mission Creek from late spring through early winter. By aligning it toward ledges jutting from the toe walls, water would tend always to be present below the ledges during the dry months and thereby replicate an important characteristic of natural aquatic environs in these coastal streams. The channel would be enriched with representative types and gradations of the larger native substrates — coarse gravels, small cobbles, and rocks or boulders as currently exist within Mission Creek

R 10.4.3.5 **Environmental commitments to minimize temporary impacts to steelhead and tidewater gobies**:

Minimize temporary adverse construction effects: If stream flow conditions are suitable, adult steelhead would be most likely to try the ascent between the middle of December and the end of March. Adolescent steelhead could be present in the creek from the middle of March through late May, on their way to the ocean. Their tenure in the lower creek depends on the speed of changes necessary for them to tolerate salt water after the first phase of life in fresh. Those complex changes transform them physiologically from young trout into steelhead smolt.

Spawning by tidewater gobies peaks in between April and July (Roberts, 2000). They construct egg clutches in substrates dominated by coarse sands or fine gravels, such as that found in the tidal lagoon below Cabrillo Boulevard. Gobies would be expected sporadically in the estuary through summer and fall, but are unlikely ever to swim upstream of Yanonali Street, primarily because a low sill spans the full creek bed at that bridge where water is quite shallow after the rainy season, and secondarily because gobies prefer more saline waters compared to the flow issuing from the sandstone channel which consists entirely of fresh water.

Measures to lessen impacts to both fish species during streambed, toe-wall, and side slope construction would differ from those applicable during annual maintenance. All are inherently geared to the two species' respective behavior which leads to spawning in their respectively different habitats. Some measures appropriate to construction needs in the estuary (where construction would begin) are not appropriate farther upstream, so they are set out here as though

in two separate regions. Work in the estuary will necessitate drying half of it at a time, from the center line to one bank, then switching sides for the opposite bank. A temporary construction exclosure is the preferred method for this requirement. While one half the estuary has thus been dried, normal tidal flush and flows regimes of the dry season can still pass through other half. At no time would the complete streambed be dammed. Work from the oxbow up will necessitate temporary diversion of lower flows. The least injurious method entails placement of a buried culvert into a suitable pilot channel and fitting its intake with appropriate fish barriers, and continuous monitoring.

Construction between Cabrillo Boulevard and Yanonali Street:

1. No construction work in water anywhere in the estuary from December 1st to June 1st;
2. Divide a suitable length of the estuary down the middle with an impermeable barrier, perhaps sheet piling. That length should be as long as practicable to minimize repetition of this divide and dry procedure for making temporary construction exclosures. A lateral coffer dam in mid-stream shall not be acceptable because of increased turbidity and fine sediments that would conveyed downstream to the coastal lagoon;
3. Dam half the estuary at the upper end of the center-line barrier with sheet piling;
4. Qualified biologists walk downstream in zigzag pattern to herd as many fish as possible from the incipient exclosure;
5. Dam the lower end of the exclosure with sheet piling immediately;
6. Fish biologists seine the entire confined half thoroughly to remove any gobies and other large organisms to the wet side of the construction exclosure;
7. Commence pumping water from the exclosure with intakes to pump fitted with ½ mesh screens;
8. Fish biologists monitor drying exclosure and seine it thoroughly at least twice a week;
9. When construction on one side has been complete, the downstream wall of the exclosure shall be removed first, followed by the upstream end;
10. Repetition of the steps above on the opposite bank

Construction between Highway 101 and Canon Perdido Street:

11. No mechanized equipment permitted in water between December 1st and the end of March;
12. If continuous flows greater than half an inch deep occur through the CalTrans portion of Mission Creek between April 1st and June 1st, operation of mechanized equipment in the stream channel shall cease and may not resume until steady flows have dropped below that threshold;
13. Prior to starting work in the next region upstream, a qualified biologist would examine all scour pools at bridge abutments, undercut concrete ledges, etc.;
14. Any steelhead, or young salmonid fish in particular, found unexpectedly in these small refuges would be relocated upstream to a receiving area previously identified and agreed

upon by NMFS and CDFG and in a manner thoroughly consistent with appropriate transportation techniques. If authorized, the monitor shall weigh, measure, remove a sample of cheek scales, remove a sample of adipose fin, and apply a permanent identification tag of acceptable properties to each salmonid discovered and relocated;

15. The biological monitor shall prepare a written report giving all pertinent details of fish relocated;
16. Silt curtains shall be deployed below the immediate area of construction. Curtains would be deployed in pairs, with a gap at least 30 feet wide between the upstream and the downstream curtain to reduce suspended sediments in the water;
17. A temporary net of appropriate size as agreed upon by NMFS and CDFG shall be strung across the existing low flow channel to prevent salmonids from entering the section of creek next to be constructed;
18. Once certified free of protected fish, the existing current would be diverted to a temporary pilot channel shall be scored in the center of the creek bed;
19. As many culvert pipes as determined necessary to carry anticipated low flows (at least 40 ft^3/sec capacity) shall be placed into the pilot channel. Culverts shall be at least 24 inches in diameter. All joints between culverts shall be smooth and the lining of each culvert shall also be smooth to the touch.;
20. Once culverts have been placed, the biologist shall monitor each section at least twice a week to verify that screens are in place over intakes and water has not leaked into the local section under construction;
21. Prior to completion of work in a given section, the temporary net shall be resuspended upstream of the culvert intake and fully across the existing low flow channel;
22. Only then shall removal of the culvert and completion of the natural streambed downstream be allowed;
23. The pair of silt curtains shall be removed;
24. The next upstream segment of creek bed and banks shall be readied in like manner.

Minimize recurrent adverse effects during future channel maintenance

ROUTINE MAINTENANCE UPSTREAM OF THE OXBOW: Reaches 1 and 2 would undergo periodic maintenance designed to balance, in so far as possible, the functional hydromorphic traits of a natural stream course with the operational needs consistent with the channel's flood control purpose. When a run of dry years occurs, these maintenance procedures would emphasize partial retention of aquatic habitat conditions which depend on healthy plants, unsorted substrate, and low flows following an established watercourse. Adherence to this plan for routine maintenance would foster a mosaic pattern of plant growth in the streambed to retain as much non-obstructive vegetation close to the water as possible. Independently of vegetation, only on an as needed basis would silts and other sediments be dug and removed from the channel.

When operational criteria do not dictate removal of sediments, the County Flood Control District would not alter the currently existing pilot channel, but instead only would cut such vegetation as has begun to grow to unacceptable size. Mowing equipment (such as a brush hog) or lopping by hand tools would be the recommended way to groom vegetation in the streambed. Systemic herbicides (formulations of glyphosphate and surfactants) would be applied as sparingly as possible and then only in a spot manner, to specific targets such as clumps of giant reed. Vegetation in the creek bed would be groomed to blunt the growth of potentially large perennials and woody species (e. g. willow saplings, mulefat, etc.) by cutting stems down low, or mowing tall herbaceous species (e.g. cattails, hemlock, etc.) to a height of two or three feet. Shorter and non-weedy vegetation which gets pushed nearly flat by streams flows of any real size would be trimmed only minimally. Half the plant growth in the stream bed would be groomed one year, the other half attended to the following year.

The combined volume of sedimentary deposits and accumulated debris from vegetation which reduces the channel's capacity by more than 15% of design specifications in any given year would be the operational threshold for sediment removal during the course of routine maintenance activities. Mechanized equipment would be used in the creek bed to restore conveyance capacity. In all likelihood, all sediments and the plants growing from them would be cleaned from a length of the stream. If discharge patterns caused by unusually wet years warrant, sediment and plants could be taken from the creek throughout reaches 1 and 2. In years when such sediment removal becomes necessary, the County would finish the work by reconstructing the pilot channel. This rebuilt channel would deliberately follow whatever course the creek had imposed on the original alignment of the pilot channel. In this fashion, the pilot channel would reflect an alignment that came about through natural processes, and which would be optimally efficient in the transport of sediments during low flow times of the year.

Climatic patterns will determine the interval between sediment removal. Unusually wet years in succession could necessitate annual sediment removal. Relatively dry years which follow each other could mean an interval of two to three years between sediment extraction, or possibly even less often than that. As a reference mark for the frequency which might be needed, in recent decades on the average about three years have elapsed between episodes of sediment extraction.

Appropriate measures for:

Regular de-silting and brushing of vegetation in the creek bed —

25. All routine maintenance shall be accomplished between August and mid-October;
26. A pair of silt curtain fences shall be set across the low flow not more than 100 yards downstream of the work area;
27. the fences shall be approximately 10 yards apart;
28. A qualified biologist would examine all pools at bridge abutments for young salmonids;

29. Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and California Fish and Game and relocated promptly to a suitable refuge;
30. A written report describing in detail any such relocations would be submitted to National Marine Fisheries Service;
31. Mechanized equipment would enter the creek via the access way at the parking lot of the church at Canon Perdido Street, that at Cota Street, or that immediately adjacent to the oxbow;
32. A front end loader or road grader working together with dump trucks (10 yd^3) would be used for the bulk of sediment and vegetation removal;
33. the pilot channel would routinely head toward and pass close to projecting ledges to keep water flowing in their general direction during the dry season;
34. vegetation in a swath half the channel wide shall be mowed, first along one side as seems convenient for an arbitrary distance (say, 250 feet), then switching to the opposite bank for another arbitrary distance, to suppress the growth of woody perennials but still allow herbaceous perennials and annuals to grow;
35. If storm events of the next winter rains leave enough sediments to warrant their removal, then during the following summer the other half of the creek bed, that where only brushing of plants occurred the previous year, would be groomed to remove obstructing sediments and plants, and to shift the chamfer and the pilot channel to the opposite side;
36. If storm events do not reduce conveyance more than 15% then the next maintenance cycle shall involve only mowing of vegetation

for maintenance of side baffles, ledges, and mid-stream boulder clusters —

37. Sediments would be removed from among boulder clusters and large rocks of the side baffles only as needed to prevent them from being covered completely;
38. If necessary, sediments shall be dug from the downstream side of boulders with a backhoe equipped with a 3 foot bucket, then dragged toward the center of the creek to be combined with streambed sediments being removed as described previously;
39. any individual boulders that might have been dislodged mechanically or displaced by currents would be pushed back into a suitable vacant spot in the baffle and reset.
40. Any propagules of giant reed or salt cedar that have taken root shall be eliminated. A combination of foliar application of glyphosphate or digging out rhizomes with hand tools could be employed. Application of herbicides should be very limited, confined to only those small locations where the most persistent and aggressive weedy plants begin to re-invade the creek bottom;
41. The remaining growth shall be cut back using a brush hog, or similar mowing attachment passed a couple feet over the tops of the rocks. The intent is to cut down woody species before they attain much height or stem expansion, but not to eradicate low-growing herbaceous plants that offer negligible friction to water currents.

Maintenance expectations between the oxbow and sandstone channel: The weir's height would push all flows smaller than 640 ft^3/sec toward and through the sandstone channel. In effect, the pattern by which sediments currently settle in the sandstone channel would remain unchanged.

Removal of silts and vegetation between the Highway 101 bridge and through the sandstone channel would continue to follow current practices.

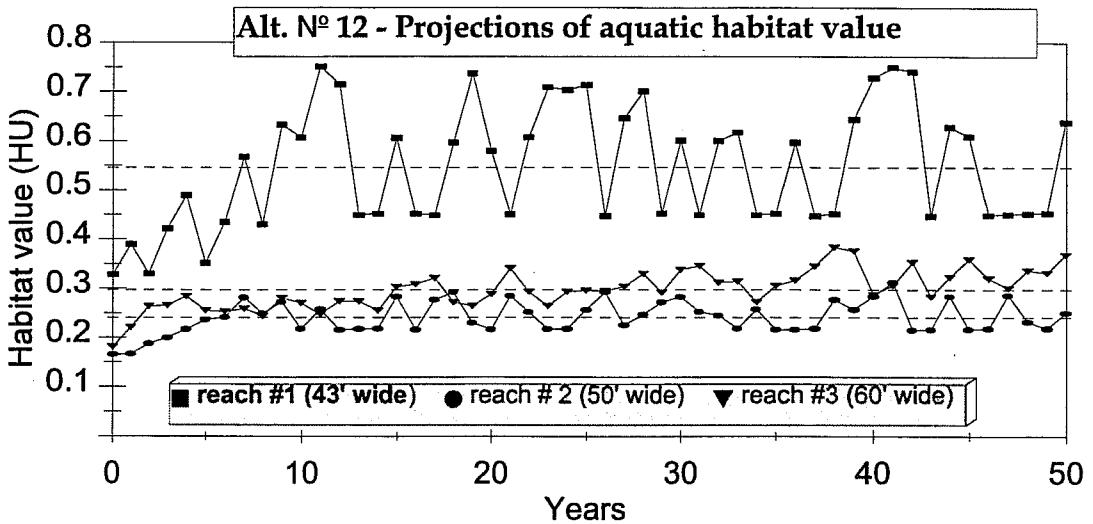
- Sediments and vegetation would be removed when channel capacity has been reduced by more than 15%;
- All routine maintenance shall be accomplished between August and mid-October;
- A qualified biologist would examine all pools at bridge abutments for young trout;
- Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and California Fish and Game and relocated promptly to a suitable refuge;
- A double line of straw bales or silt curtain shall be set across the lower end of the channel;
- A front-end loader would scoop all materials directly from the channel to trucks waiting above adjacent to the railroad tracks;
- The full width, 33 feet, would be cleaned of obstructive materials.

Estuary expected to be maintenance free: Projections of sediment transport indicate greater erosion from storm events than currently takes place. During storms, water entering the culvert would carry less sediment than it could by virtue of the blocking effect of the weir. When flows through the culvert and sandstone channel converge, this volume of cleaner water would resuspend fine sediments. Hence, the net effect of the project within the estuary should shift the composition of the streambed to gravels and small rocks, rather than fine silty sediments. Removal of silty materials or other fine sediments from anywhere in the estuary should not become a maintenance requirement of the project.

R 10.4.3.6 **<u>The balance of project impacts and benefits for Alternative 12</u>**:

Projections of aquatic habitat quality: The maintenance plans and structural mitigation features each add increments of habitat value to any given segment of the creek, and become the basis for steady improvement of it as the stream evolves. In addition to these explicit increments, a value to the creek attributable to increasing shade as plants on the slopes grow larger has been included in these calculations (details in Revised HEP Analysis, Appendix C).

The recommended alternative would lead to gradual increases of habitat quality in all three reaches (upper panel, Fig. 10-12). Those projected for the narrowest reach of the project, 43 feet between toe walls, would be greatest, in part because reach 1 encompasses the largest area of the three reaches (Table 10-1). Note the projections of sizeable and irregular decreases in habitat value in reaches 1 and 2. They arise because of periodic needs (treated arithmetically as a random event, Appendix C) to clear sediments from all the streambed above Highway 101.



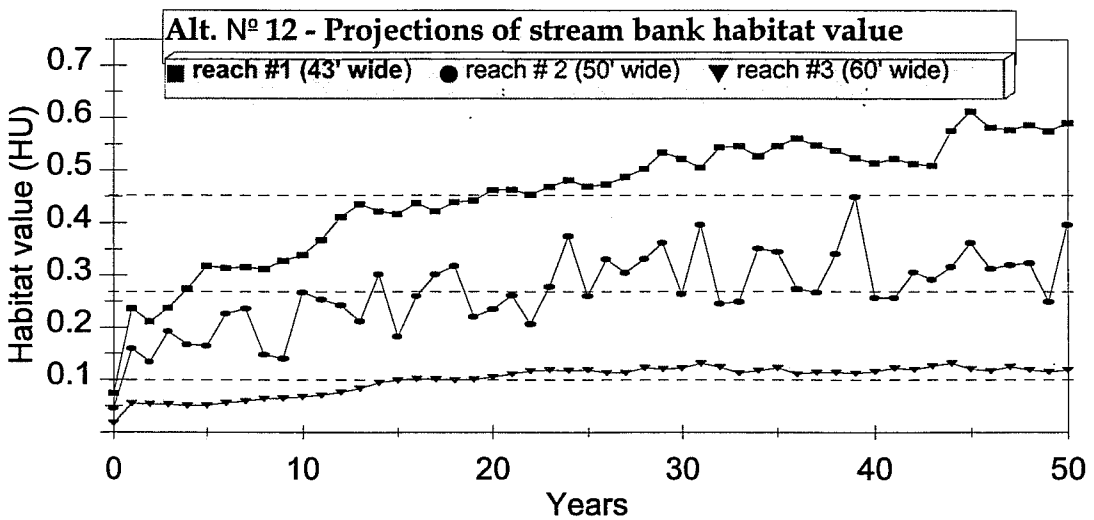


Fig. 10-12. Results of HEP analysis (Appendix C) which describe habitat values expected from the recommended alternative. Aquatic habitat appears in the upper panel, stream bank habitat in the lower, and each panel shows how habitat units (HU) for each reach might change from year to year. Dotted lines are the average habitat value of each reach respectively over the 50 year period.

Drops of that nature do not occur in projections for the thirds reach because regular maintenance should not ever become necessary below Yanonali Street with implementation of the recommended design.

Over the 50 years considered, average ecological values for reaches 1, 2, and 3 are projected to be 0.55 HU, 0.24 HU, and 0.29 HU, respectively. When added, they give a net value of 1.08 HU as the expectation of aquatic habitat value for Alternative 12.

Projections of stream bank habitat quality: Steady growth of plants appears as increased habitat value (lower panel, Fig. 10-12). Reach 1 would achieve the highest value of the three, again because it is the longest and would have the most area planted to native vegetation. Seemingly greater random fluctuations in projections for reach 2 are probably just an artifact of the set of calculations (HEP analysis, Appendix C) which generated this particular set of data.

In each reach, stream bank quality as measured by habitat units begins at a low, but not zero value. Trees preserved during construction, such as that at de la Guerra Street or that group at Mason Street confer ecological value. In addition, the habitat values presented are effectively the measure half way through each year, so even though modest during the first year after being planted, some growth of plants is anticipated.

During the life time of the proposed project, habitat quality of stream banks in reaches 1, 2, and 3 would average 0.45 HU, 0.26 HU, and 0.10 HU, respectively. Adding the averages for the three reaches gives a net value equal to 0.81 HU.

R **Canopy trees as individuals**: Alternative 12 would have short-term effects of removing between 12 and 15 of the native trees now present along the creek, but a long-term projection of at least 260 surviving new trees as replacements for those loses. Inherent design features of the recommended plan would therefore increase the numbers of native trees by a factor somewhere between 10 and 20, depending on the final number of trees removed, which cannot yet be stated precisely until final exact alignments have been determined during PED.

R **Endangered species**: Environmental commitments and structural mitigation features would result in aquatic conditions which favor habitat requirements for both species. Net benefits would to both because

- more foraging area would be available;
- the substrate of the creek would be a natural mix of sands, gavels, cobbles, and small rocks;
- the instream fauna would improve because of the latter;
- the amount of shelter from predators and stream currents would increase;
- pools should form beneath ledges and last through the dry season because the pilot channel would be laid out with that purpose and preserved when sediments have to be removed, and
- steelhead would find better currents and water conditions during migration.

R **Steelhead**: The proposed action will result in temporary degradation of habitat at the estuary, but only during the summer and fall after adults have tried to swim upstream and any smolt would normally have made their descent to the ocean. The next time steelhead would pass upstream through the estuary, during the following rainy season on the migration to upper elevations, those temporary effects would have been overcome by the larger estuary and the assorted refugia to provide hideouts for fish. When completed, the proposed design would also involve boulder clusters designed to blunt stream velocities and produce many small pools and runs which steelhead would exploit while moving upstream, additional protective ledges and bouldery linings of the creek's walls. Within a few years, plantings of native trees and shrubs on the finished banks would shade much of the creek.

Water should move through this final portion of Mission Creek at lower velocities than occur presently because the creek bed would be both wider throughout and have a soft bottom of natural materials. Sediment deposition and erosion would differ only marginally from existing patterns. The substrate in the estuary should become coarser with more gravelly places than now.

The design of the weir to control water movement at the split between the existing watercourse through the oxbow channel and the proposed bypass culvert would avoid completely any adverse impacts to migration of steelhead. At the strong recommendation of NMFS during meticulous planning discussions with hydraulic engineers from both agencies, all discharges less than 640 ft^3/sec would pass through the oxbow by virtue of the weir's design. Functional properties of the bypass culvert thus would not be a hazard to steelhead adults or smolt.

Maintenance procedures of the finished stream channel would occur between late summer and early fall. Aside from the possible need to relocate smolt seeking summer refuges at scour pools adjacent to bridges, the mosaic pattern of annual channel maintenance should not affect steelhead in any way. Pools formed beneath fish ledges or among the boulder clusters during the rainy season would be left untouched during channel maintenance.

The design and implementation of this proposed flood control project can be accomplished with minimal adverse and temporary effects to steelhead. The Corps anticipates design features and structural mitigation features should actually improve the conditions for steelhead migration through the lower reach of Mission Creek.

All unavoidable and incidental impact to this species would be more than offset by implementation of the recommended alternative.

R **Tidewater goby**: The proposed action will result in temporary degradation of habitat and ecological resources found associated with the estuary and important to the life cycle of tidewater gobies. At the completion of construction work, late in the fall of the first year of the schedule, between Cabrillo Boulevard and Yanonali Street those temporary effects would have been overcome by the larger estuary (more than double in existing surface area) and the assorted refugia to provide hideouts for fish.

Water should move through this final portion of Mission Creek at similar velocities as occur presently because the creek bed would be both wider throughout and have a soft bottom of

natural materials. Sediment deposition and erosion would differ only marginally from existing patterns. The substrate in the estuary should become coarser with more gravelly places than now.

Measures to reduce the impact to tidewater gobies include relocation of individuals by a knowledgeable and qualified biologist. Together, all measures should avoid long-term and permanent adverse effects to this population of tidewater gobies. The proposed scheduling commitments and monitoring would minimize any short-term potential effects.

The design and implementation of this proposed flood control project can be accomplished with only minimal adverse and temporary effects to tidewater gobies. The Corps anticipates design features and structural mitigation features should actually improve microhabitat conditions for gobies in Mission Creek's estuary.

All unavoidable and incidental impact to this species would be more than offset by implementation of the recommended alternative.

R **The Moreton Bay Fig**: The distance between the dripline (roughly the maximum lateral extent of the primary roots) and construction activities required for the recommended alternative is great enough to prevent any adverse effects to that root system. Nothing associated with the project would damage its trunk, branches, or foliage.

The recommended alternative would be accomplished without any foreseeable consequences to the fig tree.

10.4.4 **Alternative 6: 3400 CFS Capacity without Oxbow Bypass, Stabilized Sides Using Predominantly Vegetated Stepped Walls with Vertical Walls Applied for the Remaining Reaches**:

10.4.4.1 **Design Features**:

Alternative 6 entails shaping two pair of walls. The inner pair would define the sides of the stream channel (Fig. 10-13). A second pair outside those would rise to the top of the slope, approximately 12 feet above the channel bottom. A space between the inner and outer wall on each side of the channel would be filled with native soils to form a planter about 5½ feet above the streambed.

Width of the area available for planting in this design, not more than 5½ feet on average throughout the project reach imposes a limit on the size of vegetation that may be considered. Native trees whose growth form tends toward a lush canopy would be ill-suited to this design. If design accommodations were made to allow their root systems full access to native soils of the stream bed, the roots and crown of the tree would probably break up the inner walls within a few years as the trees grow. Yet a design which restricts lateral expansion of the crown and hinders the root system from completely reaching the soils below the walls would stunt the trees and thwart the purpose for planting them in the first place.

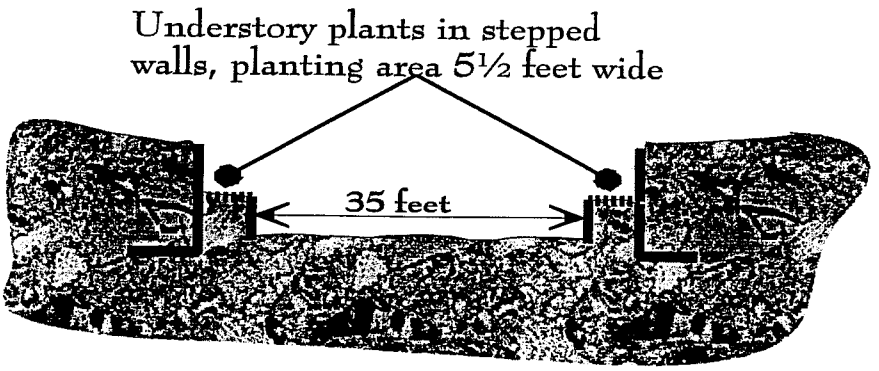


Fig. 10-13. Arrangement of inner channel walls (35 feet apart), a stepped planting area which would admit of native understory species, but not canopy species, and an outer pair of walls rising 12 feet above the channel bottom. Not to scale.

Understory species could be planted along these two strips. When fully grown, this planting would shade the sides of the channel. In reality however, limitations of space would prevent establishment of the ecological functions of stream bank vegetation.

Alternative 6 does not require construction of a culvert to bypass the oxbow. All discharges from the watershed would continue to flow through the widened oxbow and sandstone channel.

R 10.4.4.2 **Impact Analyses**:

Since Alternative 6 would have exactly equivalent effects on biological resources in all respects, the descriptions of impacts due to construction and maintenance, as well as mitigation features and environmental commitments are not reiterated here. Conclusions about impacts arising from Alternative 6 parallel those of Alternative 12.

Aquatic habitat: The degradation of aquatic habitat due to construction would be exactly equivalent to the existing habitat value of the future without project, namely 0.73 HU. Construction impacts cannot be avoided, but mitigation measures developed for Alternative 12 could be be implemented under Alternative 6 and would negate these impacts entirely and render them effectively temporary in nature.

R **Stream bank habitat**: Most native trees now growing along the banks would be removed during bank excavation, although the precise losses would depend on minutely detailed construction plans yet to be prepared. Of the western sycamores now present on the creek, that at de la Guerra Street and the group at Mason Street could possibly be preserved. Trees at the other four locations would be removed.

The degradation of stream bank habitat due to construction would be exactly equivalent to the existing habitat value of the future without project, namely 0.48 HU. The design of this alternative does not accommodate planting native trees and shrubs in sufficient numbers to compensate for impacts to stream bank habitat, nor for the removal of individual skyline trees.

R **Endangered species**: Alternative 6 would lead to exactly the same level of temporary and incidental unavoidable impacts to steelhead and tidewater gobies. Complete implementation of mitigation measures and environmental commitments developed for Alternative 12 would negate these impacts entirely. Less than complete implementation could result in measurable impacts to one or the other species.

R **The Moreton Bay Fig Tree**: Alternative 6 would not entail any construction activities in the vicinity of this landmark tree. No impacts would occur to it.

R 10.4.4.3 **The balance of project impacts and benefits for Alternative 6**:

Projections of aquatic habitat quality: The HEP analysis (Revised HEP Analysis, Appendix C) for Alternative 6 assumes the hydraulic properties of the design would be equivalent to those calculated for Alternative 12. It assumes also complete implementation of every element of planning to offset project related effects to aquatic habitat as described for Alternative 12. Those components were not included in the analysis summarized by the DEIS/EIR.

The benefits to aquatic habitat which come from shade cast by trees along the banks must be subtracted, because large trees cannot survive in the arrangement of stepped walls. The walls themselves would shade the streambed to some degree, but the net change of shading has not been calculated from numeric models of the creek, its banks, and general orientation. Over the 50 years considered, average aquatic habitat values for reaches 1, 2, and 3 are estimated to be approximately 0.45 HU, 0.20 HU, and 0.26 HU respectively. Adding them gives a net projection of 0.91 habitat units, based on the foregoing assumptions regarding differences between Alternatives 6 and 12.

R **Projections of stream bank habitat quality**: Projections of environmental quality were made in exactly the same manner as for Alternative 12 (Appendix C), but restricted to understory species alone. These calculations show the habitat quality derived from stepped plantings to be equivalent to 0.26 habitat units.

The HEP analysis for Alternative 6 assumes all five remnants of private property described for Alternative 12 would be transformed into habitat expansion zones. The small area on the left bank of the oxbow could be used as well, although trees there under Alternative 6 could never extend down to the creek's edge. Habitat expansion zones implemented with Alternative 6 would lack the continuity to vegetation along the riprap slope of the recommended

alternative and would be discounted in value slightly on that account. Weighing these considerations, habitat expansion zones for Alternative 6 would yield approximately 0.14 habitat units.

Adding the value of stepped plantings with habitat expansion zone value, the net expectation for habitat quality of Alternative 6 is estimated to be 0.40 habitat units, based on the foregoing assumptions regarding differences between Alternatives 6 and 12.

Habitat expansion zones would yield approximately 115 native trees. The number of trees removed by implementation of this design, which cannot yet be stated precisely, would be replaced by approximately ten times as many.

Endangered species: Alternatives 6 and 12 are nearly alike regarding net effects on aquatic habitat and incidental impacts to steelhead and tidewater gobies during construction. Therefore, implementation of Alternative 6, which would duplicate in every respect the mitigation features and maintenance procedures as described for the recommended plan, would result in all unavoidable and incidental impacts being only temporary and mitigated to a level less than significant.

R **The Moreton Bay Fig Tree**: Alternative 6 could be accomplished fully without any adverse effects to this botanical specimen.

R 10.4.4.4 **Residual Impacts**:

Construction of Alternative 6 would degrade aquatic habitat and stream bank habitat between Canon Perdido Street and Cabrillo Boulevard. There would be a net loss of stream bank habitat. Single trees removed during construction would be replaced approximately 10 for 1.

Temporary impacts could occur to steelhead and tidewater gobies during construction. Environmental commitments and mitigation features which would be installed would result in increased aquatic habitat quality of a level more than sufficient to render those temporary impacts insignificant. Environmental commitments to be instituted during periodic channel maintenance would avoid all impacts to either endangered species.

No adverse consequences would occur to the More Bay Fig by implementation of Alternative 6.

Alternative 6 could be accomplished without residual impacts of any level to any biological or ecological resources.

10.4.5 **Alternative 8: 3400 CFS Capacity with Oxbow Bypass, Stabilized Sides Using Predominantly Combination of Vertical Wall**:

10.4.5.1 **Design Features**:

This structural flood control alternative differs from Alternative 12 in only a fundamental, respect. Vertical walls throughout the project length would replace the combination of toe walls and planted riprap slope which characterize the recommended alternative. Native trees and shrubs would be planted only in habitat expansion zones. No vegetation could be planted inside the finished channel. In all other design features, Alternative 8 duplicates Alternative 12.

R 10.4.5.2 **Impact Analyses**:

Since this alternative would require the same right of way as that of Alternative 12, it would have exactly equivalent effects on biological resources in all respects. The conclusions about impacts arising from Alternative 8 parallel those of Alternative 12.

Aquatic habitat: The degradation of aquatic habitat due to construction would be exactly equivalent to the existing habitat value of the future without project, namely 0.73 HU. Construction impacts cannot be avoided, but mitigation measures developed for Alternative 12 could be be implemented under Alternative 8 and would negate these impacts entirely and render them effectively temporary in nature.

R **Stream bank habitat**: Most native trees now growing along the banks would be removed during bank excavation, although the precise losses would depend on minutely detailed construction plans yet to be prepared. Of the western sycamores now present on the creek, that at de la Guerra Street and the group at Mason Street could possibly be preserved. Trees at the other four locations would be removed.

The degradation of stream bank habitat due to construction would be exactly equivalent to the existing habitat value of the future without project, namely 0.48 HU. The design of this alternative does not accommodate planting native trees and shrubs in sufficient numbers to compensate for impacts to stream bank habitat, nor for the removal of individual skyline trees.

R **Endangered species**: Alternative 8 would lead to exactly the same level of temporary and incidental unavoidable impacts to steelhead and tidewater gobies. Complete implementation of mitigation measures and environmental commitments developed for Alternative 12 would negate these impacts entirely. Less than complete implementation could result in measurable impacts to one or the other species.

R **The Moreton Bay Fig Tree**: Alternative 8 would not entail any construction activities in the vicinity of this landmark tree. No impacts would occur to it.

R 10.4.5.3 **The balance of project impacts and benefits for Alternative 8:**

Projections of aquatic habitat quality: The HEP analysis (Revised HEP Analysis, Appendix C) for Alternative 8 assumes the hydraulic properties of the design would be equivalent to those calculated for Alternative 12. It assumes also complete implementation of every element of planning to offset project related effects to aquatic habitat as described for Alternative 12. Those components were not included in the analysis summarized by the DEIS/EIR.

The benefits to aquatic habitat which come from shade cast by trees along the banks must be subtracted, because large trees cannot survive in the arrangement of stepped walls. The walls themselves would shade the streambed to some degree, but the net change of shading has not been calculated from numeric models of the creek, its banks, and general orientation. Over the 50 years considered, average aquatic habitat values for reaches 1, 2, and 3 are estimated to be approximately 0.45 HU, 0.20 HU, and 0.26 HU respectively. Adding them gives a net projection of 0.91 habitat units, based on the foregoing assumptions regarding differences between Alternatives 8 and 12.

R **Projections of stream bank habitat quality**: Projections of environmental quality were made in exactly the same manner as for Alternative 12 (Appendix C), but include only the projected values attributable to trees and shrubs planted in habitat expansion zones. Design of these vertical walls throughout does not accommodate any trees or shrubs within the stream channel.

The HEP analysis for Alternative 8 assumes all five remnants of private property described for Alternative 12 would be transformed into habitat expansion zones. The small area on the left bank of the oxbow could be used as well, although trees planted there under Alternative 8 could never extend down to the creek's edge. Habitat expansion zones implemented with Alternative 8 would lack the continuity to vegetation along the riprap slope of the recommended alternative and would be discounted in value slightly on that account. Weighing these considerations, habitat expansion zones for Alternative 8 would yield approximately 0.14 habitat units.

Habitat expansion zones would yield approximately 115 native trees. The number of trees removed by implementation of this design, which cannot yet be stated precisely, would be replaced by approximately ten times as many.

Endangered species: Alternatives 8 and 12 are nearly alike regarding net effects on aquatic habitat and incidental impacts to steelhead and tidewater gobies during construction. Therefore, implementation of Alternative 8, provided it would duplicate in every respect the mitigation features and maintenance procedures as described for the recommended plan, would result in all unavoidable and incidental impacts being only temporary and mitigated to a level less than significant.

R **The Moreton Bay Fig Tree**: Alternative 8 could be accomplished fully without any adverse effects to root systems, trunk, or branches of this tree.

R 10.4.5.4 **Residual Impacts**:

Construction of Alternative 8 would degrade aquatic habitat and stream bank habitat between Canon Perdido Street and Cabrillo Boulevard. There would be a net loss of stream bank habitat. Single trees removed during construction would be replaced approximately 10 for 1.

Temporary impacts could occur to steelhead and tidewater gobies during construction. Environmental commitments and mitigation features which would be installed would result in increased aquatic habitat quality of a level more than sufficient to render those temporary impacts insignificant. Environmental commitments to be instituted during periodic channel maintenance would avoid all impacts to either endangered species.

No adverse consequences would occur to the More Bay Fig by implementation of this alternative plan.

Alternative 8 could be accomplished without residual impacts of any level to any biological or ecological resources.

R 10.5 **ALTERNATIVES COMPARED FOR EFFECTS ON BIOLOGICAL RESOURCES**:

Some of the following comparisons rely entirely on expectations of ecological value expressed as habitat units (HU), numbers which come from the Habitat Evaluation Procedure. Both average values and the pattern of changes in habitat value lead to useful comparisons between alternatives. The ecological rationales for the various equations, the equations themselves, their mutual interdependence, and the arithmetic needed to derive numerical answers from them are certainly best presented elsewhere (Revised HEP Analysis, Appendix C).

R 10.5.1 **Alternatives 12 and 1**:

10.5.1.1 **Biological resources of concern within the project area**:

Aquatic habitat values: Comparisons of the averages themselves indicate a net increase of aquatic habitat ecological value within each reach of the project. These stem directly from the mitigation features which the project includes. Aquatic habitat would achieve higher values in each reach by implementation of the proposed project than would be the case in the future without the project (Table 10-7).

Table 10-7. Average of projections of habitat quality, in habitat units, of the aquatic habitat in lower Mission Creek. Each is the average as described in the text, and represents an expected equilibrium habitat value of the long-term trend within each separate reach.

REACH	PROPOSED FLOOD CONTROL DESIGN	FUTURE WITHOUT PROJECT
43 feet wide	0.55 HU	0.36 HU
50 feet wide	0.24 HU	0.11 HU
60 feet wide	0.29 HU	0.19 HU

Average habitat values over the 50-year life of the project increase by 0.19 HU in reach 1, 0.13 HU in reach 2, and 0.10 HU in reach 3, respectively. Expressed as percentages, the recommended alternative would yield 49%, 126%, and 52% higher aquatic habitat values than the future without project, respectively.

Implementation of the recommended alternative would be expected to elicit changes in habitat quality of the stream over the project's lifetime. Once completed, the structural features — large boulders along the sides of the creek, boulder clusters in the creek, ledges jutting from the walls, pilot channel leading low flows under the ledges, molded relief of wall surfaces in the estuary to provide refugia for smaller fish, absence of concrete, and native materials forming better substrate for many aquatic organisms — would confer a starting habitat value attributable to the structural features themselves. Natural processes would soon begin to modify aquatic conditions around them, just as large rocks and natural overhangs and so forth form the basis for natural aquatic microhabitat. Habitat quality would rise initially, then approach an equilibrium value. The average represents the expectation for that equilibrium. In each reach, Alternative 12 attains a higher average than the future without project (Table 10-7).

Aquatic habitat values of both Alternative 12 and the future without project fluctuate somewhat unpredictably from one year to the next (Fig. 10-14). In reaches 1 and 2, Alternative 12 would seem to exhibit proportionately greater yearly fluctuations compared to the future without project This seems in keeping with the more common application of hardened revetments to the banks and margins of the streambed in these two portions of the creek than in the estuary. Being less natural on this account the existing streambed in these two reaches responds less to natural hydraulic processes. The recommended alternative would remove those hardened places from all three reaches and be somewhat more dynamic as a result.

Adding the habitat value projected for each reach gives an overall view of changes expected for both alternatives (upper panel, Fig. 10-15). After the first year the recommended alternative would exhibit higher aquatic value than the future without project. The recommended alternative starts out slightly lower than existing condition, but then steadily increases over the next 7 to 10 years to an equilibrium value of 1.08 habitat units. Notable fluctuations in habitat value occur when sediment removal becomes necessary, and after that habitat quality rises again. However, after about 8 to 10 years, the recommended alternative seems to attain a rough equilibrium state where maintenance activities and innate tendencies to improve balance each other in the long term.

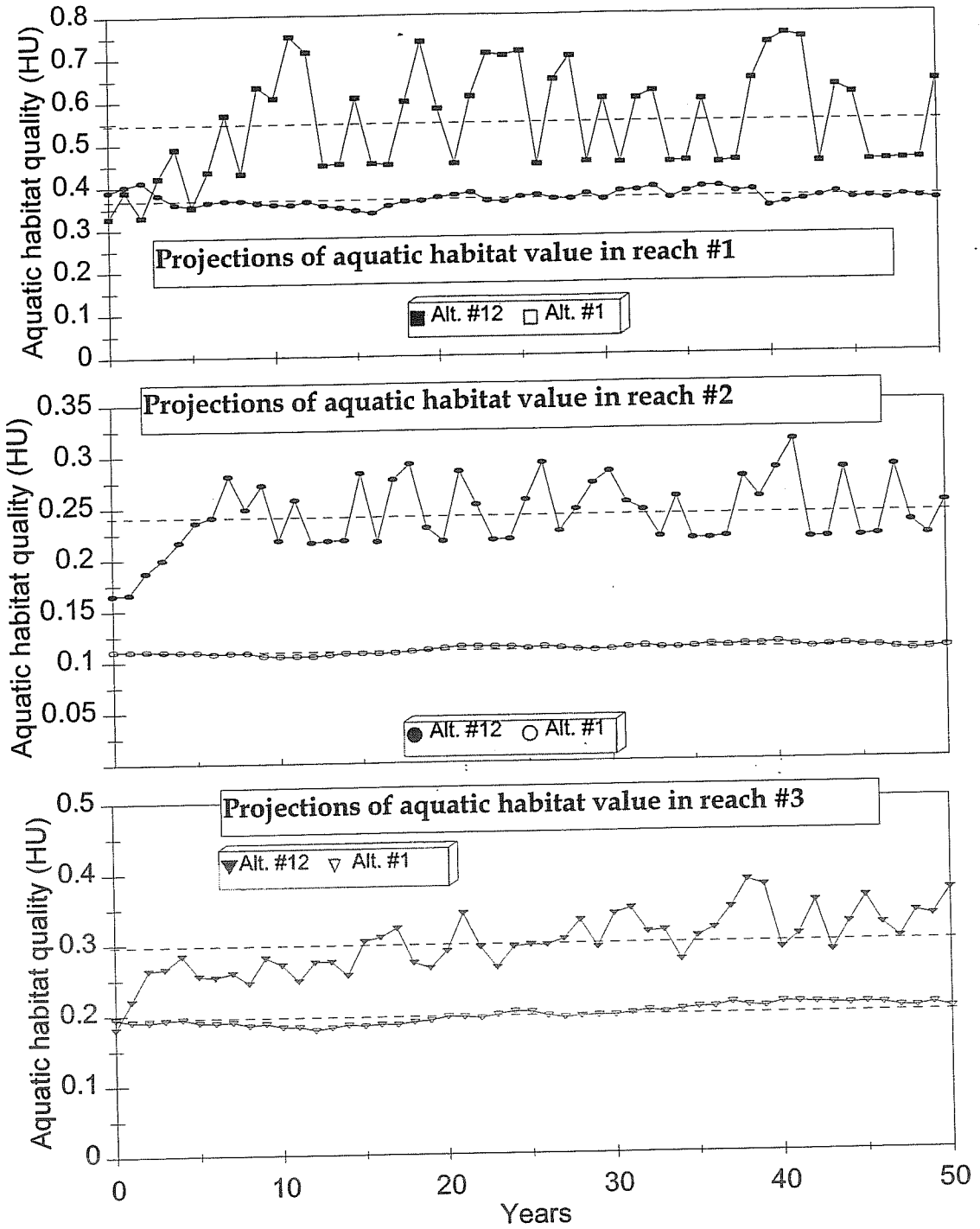


Fig. 10-14. Aquatic habitat value projected for Alternatives 12 and 1 in Lower Mission Creek. Each panel shows a representative long term pattern of changing quality in the aquatic habitat for the recommended project (upper lines) and the future without project (lower lines) in reach 1, 2, or 3: upper, middle, or lower panel, respectively. The dotted line indicates the average of averages, as described in the text. Note the difference in scales of the three vertical axes.

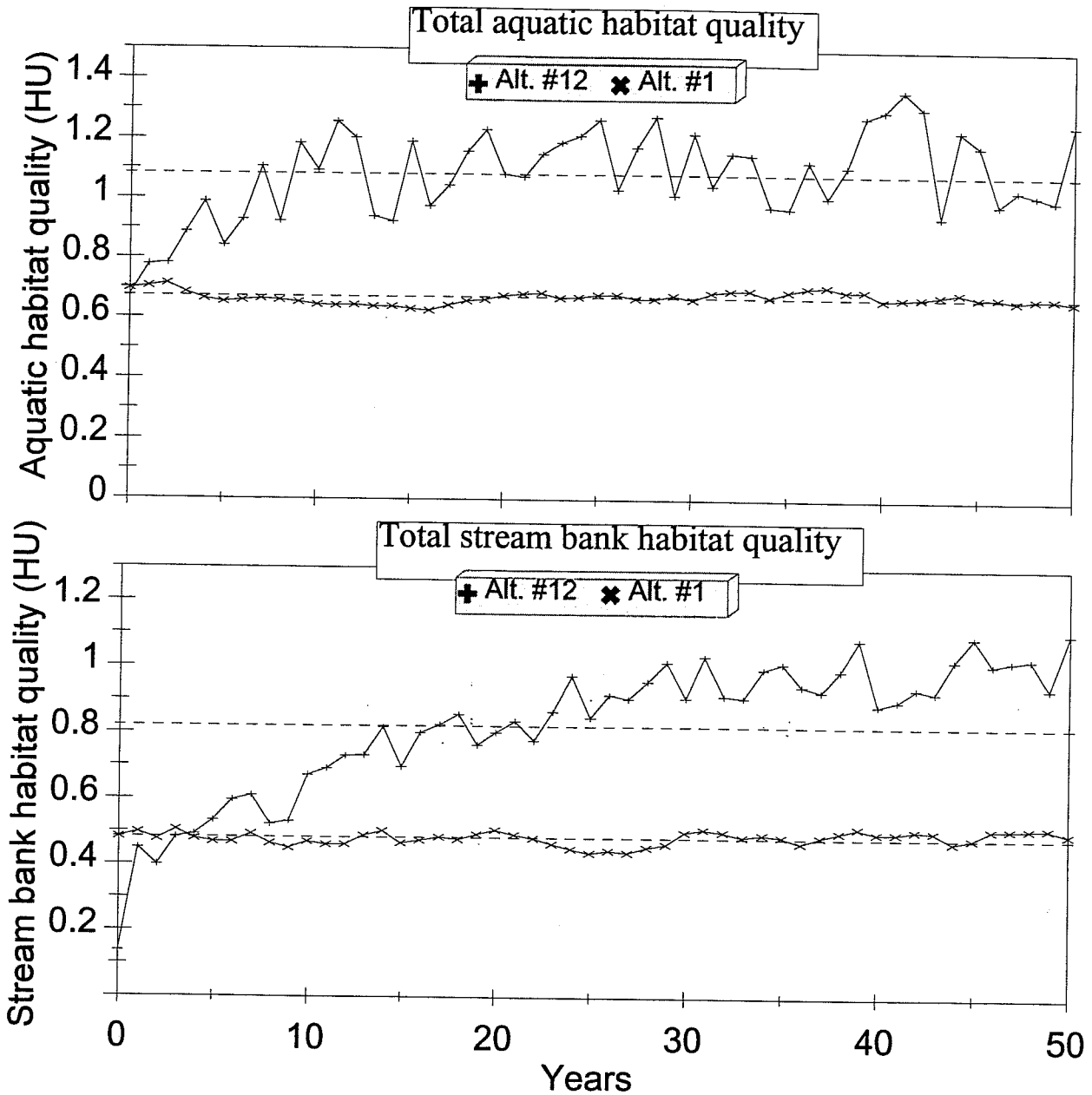


Fig. 10-15. Comparison of habitat values (HEP analysis, Appendix C)expected with the recommended alternative and the future without project. Aquatic habitat appears in the upper panel, stream bank habitat in the lower, and each panel shows how habitat units (HU) for each reach might change from year to year. Dotted lines are the average habitat value of each reach respectively over the 50 year period.

The future without project is seen to be already in a rough equilibrium. It exhibits variation around its long-term average value, 0.66 habitat units, but shows no discernible long term trend in habitat value either upward or downward.

Stream bank habitat values: Habitat values attributable to plants growing on riprap slopes above the toe walls and those attributable to habitat expansion zones have been added here. The recommended alternative would yield greater average values of habitat quality for streambanks in reaches 1 and 2 than the future without project. Stream bank habitat within reach 3, the estuary, would be marginally lower than the future without project (Table 10-8).

Table 10-8. Average of projections of habitat quality, in habitat units, of the stream bank habitat in lower Mission Creek.

REACH	PROPOSED FLOOD CONTROL DESIGN	FUTURE WITHOUT PROJECT
43 feet wide	0.45 HU	0.24 HU
50 feet wide	0.26 HU	0.11 HU
60 feet wide	0.10 HU	0.12 HU

The equilibrium stream bank values projected by the HEP analysis for the habitat value of native plants along riprap slopes and in habitat expansion zones would indicate substantial improvements for reaches 1 and 2, 0.21 HU (88%) and 0.15 HU (136%), respectively. The physical limitations of right of way and design needs for full height vertical walls to be squeezed into that limited width restrict the plantable areas in most of the estuary. As designed, the recommended alternative would yield lower stream bank values compared to the future without project, a decrease of 0.02 HU (-17%). This difference may be just an inconsequential outcome of the comparatively unsophisticated equations and not indicative of any genuine biological difference.

The length of time required for trees and shrubs to grow from the initial size to an appreciable size can be seen (Fig. 10-16) in each reach of the project, where the recommended alternative starts with quite low values — below the values for future without project conditions in every case — then starts to increase. In reach 1, stream bank habitat quality of the recommended alternative surpasses the future without project after about the fifth year and by the second or third year in reach 2. However, reach 3 would lag behind the future without project for 25 years, according to these projections.

When the habitat values are added together for each reach (lower panel, Fig. 10-15) the recommended alternative could be expected to achieve the overall value of the future without project in about 4 to 5 years. It exhibits a fairly steady rate of increase for about 15 to 20 years, then would begin to slow down somewhat. These numerical projections would be consistent with steady attainment of the expected growth form of canopy trees and understory shrubs during the first couple of decades, then proportionately less increase of habitat value as both structural layers of the stream bank habitat fill in.

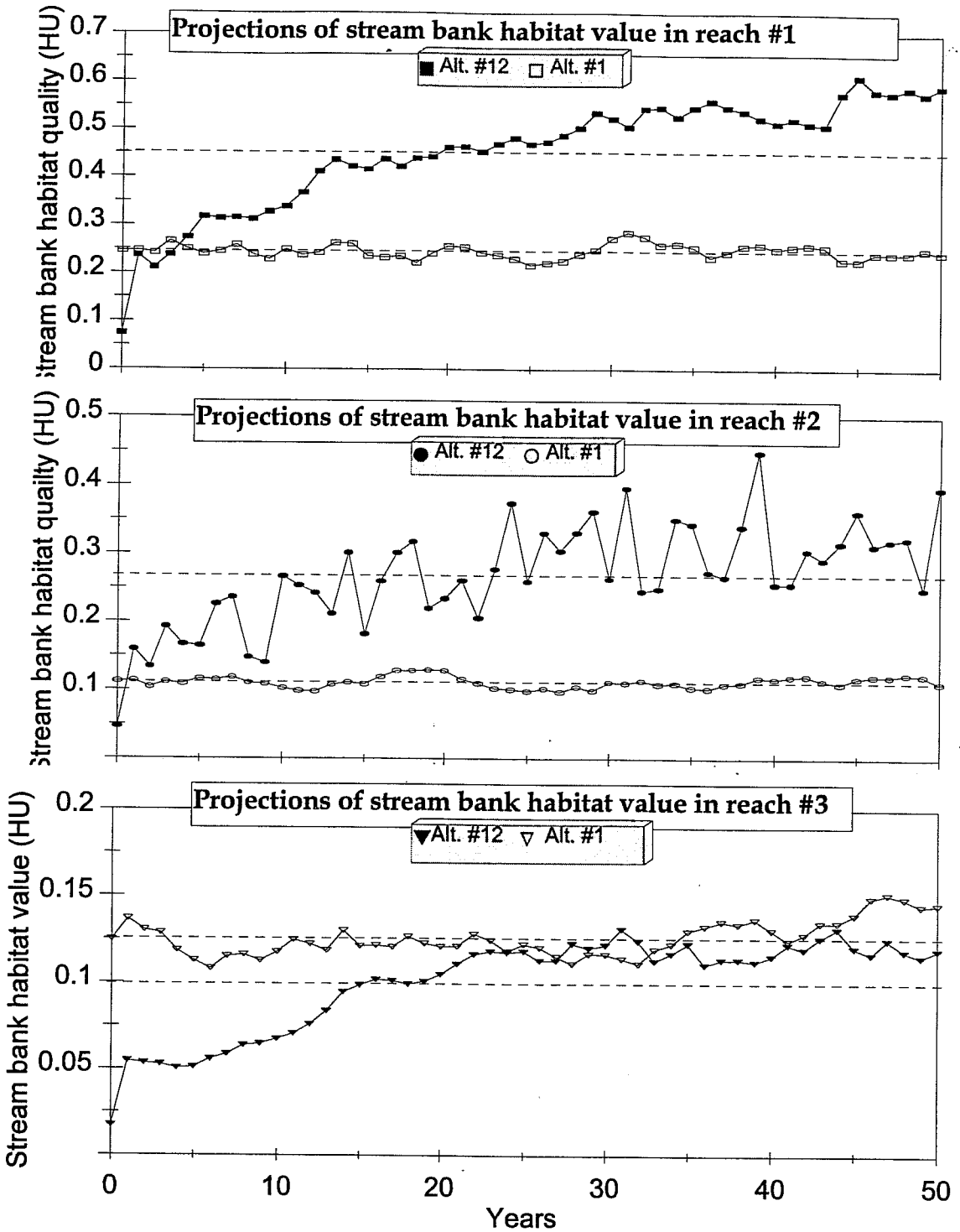


Fig. 10-16. Stream bank habitat value projected for Alternatives 12 and 1 in Lower Mission Creek. Each panel shows a representative long term pattern of changing quality of stream bank habitat for the recommended project (upper lines) and the future without project (lower lines) in reach 1, 2, or 3: upper, middle, or lower panel, respectively. The dotted line indicates the average of averages, as described in the text. Note the difference in scales of the three vertical axes.

Viewed in the aggregate, the future without project exhibits no obvious long-term trend either upward or downward. It rises a bit, then falls again over the years but, on balance, would seem to stay close an equilibrium value of 0.47 habitat units.

Replacement of canopy trees: The recommended alternative would install a minimum of 290 trees native to this historic riparian community. With proper attention during the first five years of their lives (Appendix H) at least 90% of that number would be securely established along the sloped banks and in five habitat expansion zones. Alternative 12 would yield a minimum of 260 trees appropriate to this habitat.

No additional trees can be foreseen under the future without project.

Endangered species: Incidental and temporary impacts of an unmeasurable level are anticipated to both steelhead and tidewater gobies with construction and maintenance of the recommended alternative. Mitigation in the form of structural features which would enhance aquatic habitat value and appropriate environmental commitments which would avoid or minimize those incidental effects are essential components of the recommended alternative. On balance, the proposed design would improve stream heterogeneity and flow conditions during the migratory seasons of steelhead and foraging habitat and shelter within the estuary for tidewater gobies.

No significant change of aquatic habitat conditions is expected with the future without project. Neither steelhead nor tidewater gobies would experience any foreseeable change to their respective microhabitat conditions from adoption of Alternative 1.

Moreton Bay Fig: Neither Alternative 12 nor Alternative 1 would affect the fig tree.

R 10.5.1.2 **Summary**:

Table 10-9 summarizes the numeric projections from the HEP analysis (Appendix C) of aquatic habitat and stream bank habitat under the No Action Alternative and Alternative 12, and differences between the two regarding endangered species, native trees, and the Moreton Bay Fig Tree.

Table 10-9. Long-term expectations regarding biological resources in Lower Mission Creek for the recommended design, Alternative 12, and the future without project, Alternative 1. Where habitat values are concerned, numbers are given in habitat units, HU. Numbers enclosed within brackets are the difference between projections for Alternative 12 and Alternative 1.

	Alternative 12	Alternative 1
aquatic habitat	1.08 HU {net yield of 0.42 HU}	0.66 HU
stream bank habitat	0.81 HU {net yield of 0.34 HU}	0.47 HU
Totals	**1.89 HU {net yield of 0.76 HU}**	**1.13 HU**
steelhead and tidewater goby	incidental impacts fully mitigated by structural features and environmental commitments	no foreseeable incidental impacts
native trees which contribute to a riparian canopy	at least 260 healthy trees of several species would be established after 5 years	no additional trees would be anticipated
Moreton Bay Fig Tree	unaffected by construction or maintenance	unaffected

Residual Impacts: Implementation of the recommended alternative would not result in any residual impacts when compared to the future without project.

R 10.5.2 **Alternatives 6 and 1**:

10.5.2.1 **Biological resources of concern within the project area**:

Aquatic habitat value: The design of stepped walls for Alternative 6 precludes beneficial effects on aquatic habitat due to nearly complete lack of shade from trees directly above the streambed. Native plants that form the canopy and the understory of the historic biological community would be established only where creation of habitat expansion zones could be accomplished, since the design of paired walls enclosing a planter would accommodate only perennial shrubs. Otherwise, exactly the same environmental commitments and structural features placed in the creek or at the inside of the walls, as described for Alternative 12, would be implemented for Alternative 6.

Graphical projections of these numerical results were intentionally foregone in this section because the average for each reach is lower than that for the recommended alternative (Table 10-10).

Table 10-10. Average of projections of habitat quality, in habitat units, of the aquatic habitat in Lower Mission Creek for Alternative 6.		
REACH	ALTERNATIVE 6	FUTURE WITHOUT PROJECT
43 feet wide	0.45 HU	0.36 HU
50 feet wide	0.20 HU	0.11 HU
60 feet wide	0.26 HU	0.19 HU

Average habitat values over the 50-year life of the project would increase above the future without project by 0.09 HU in reach 1, 0.09 HU in reach 2, and 0.07 HU in reach 3, respectively. When expressed as a percentage of the long-term average for the future without project, these increases attributable to Alternative 6 amount to 25%, 82%, and 37% higher aquatic habitat value.

Stream bank habitat values: These numerical summary data combine the projections of habitat quality derived from plants in the stepped walls with those from habitat expansion zones outside the walls. Design features of Alternative 6 would diminish the overall quality of this habitat, and indeed, it is somewhat a misnomer to speak of stream bank habitat in the context of this design. Streams banks as one ordinarily thinks of them would not be present.

Again, graphical projections of these numerical results were intentionally foregone in this section because the average for each reach is lower than that for the recommended alternative (Table 10-11).

Table 10-11. Average of projections of habitat quality, in habitat units, of the "stream bank habitat" in Lower Mission Creek for Alternative 6.		
REACH	ALTERNATIVE 6	FUTURE WITHOUT PROJECT
43 feet wide	0.20 HU	0.24 HU
50 feet wide	0.09 HU	0.11 HU
60 feet wide	0.11 HU	0.12 HU

Because this design curtails planting between the tops of the stream channel, average habitat values over the 50-year life of the project would decrease within each reach. Reach 1 would lessened by 0.04 HU, reach 2 by 0.03 HU, and the third reach would have lower quality by 0.01 HU. When expressed as a percentage of the long-term average for the future without project, these reductions attributable to Alternative 6 amount to -17%, -27%, and -8%, respectively.

Replacement of canopy trees: The species which grow to large size and form the canopy of riparian communities cannot be planted within the stream channel under Alternative 6. The habitat expansion zones described for Alternative 12 would accommodate native trees, however.

Alternative 6 would install approximately 115 trees native to this general habitat. With proper attention during the first five years of growth (Appendix H) at least 90% of the number would be well rooted in habitat expansion zones. Alternative 6 would yield a minimum of 104 trees appropriate to this habitat.

Endangered species: The excavation requirements for this alternative are precisely the same as those for the recommended design. All environmental commitments and mitigation features for Alternative 12 would be exactly applicable to Alternative 6. The expected long-term consequences of Alternative 6 on both steelhead and tidewater gobies would be identical to those expected for Alternative 12.

Moreton Bay Fig: Alternative 6 could be accomplished without any effect of any kind to this tree.

R 10.5.1.2 **Summary**:

Table 10-12 summarizes the numeric projections from the HEP analysis (Appendix C) of aquatic habitat and stream bank habitat under the No Action Alternative and Alternative 6, and differences between the two regarding endangered species, native trees, and the Moreton Bay Fig Tree.

Table 10-12. Long-term expectations regarding biological resources in Lower Mission Creek for Alternative 6 and the future without project, Alternative 1. Where habitat values are concerned, numbers are given in habitat units, HU. Numbers enclosed within brackets are the difference between projections for Alternative 6 and Alternative 1.

	Alternative 12	Alternative 1
aquatic habitat	0.91 HU {net yield of 0.25 HU}	0.66 HU
stream bank habitat	0.40 HU {net reduction of 0.07 HU}	0.47 HU
Totals	**1.31 HU {net yield of 0.18 HU}**	**1.13 HU**
steelhead and tidewater goby	incidental impacts fully mitigated by structural features and environmental commitments	no foreseeable incidental impacts
native trees which contribute to a riparian canopy	at least 104 healthy trees of several species would be established after 5 years	no additional trees would be anticipated
Moreton Bay Fig Tree	unaffected by construction or maintenance	unaffected

Residual Impacts: Implementation of Alternative 6 would result in a net reduction equivalent to 0.07 habitat units attributable to loss of stream bank vegetation when compared to the future without project.

R 10.5.3 **Alternatives 8 and 1**:

10.5.3.1 **Biological resources of concern within the project area**:

Aquatic habitat value: In the same manner as the stepped-wall design (Alternative 6) just considered would preclude beneficial effects on aquatic habitat due to lack of shade from trees directly above the streambed, so also would Alternative 8. Indeed, the rectangular box design of this alternative admits no canopy or understory plants anywhere between the top of the walls. Native plants that form the canopy and the understory of the historic biological community would be established only where creation of habitat expansion zones could be accomplished. Otherwise, exactly the same environmental commitments and structural features placed in the creek or at the inside of the walls, as described for Alternative 12, would be implemented for Alternative 8.

Graphical projections of these numerical results were intentionally foregone in this section because the average for each reach is lower than that for the recommended alternative (Table 10-13).

Table 10-13. Average of projections of habitat quality, in habitat units, of the aquatic habitat in Lower Mission Creek for Alternative 8.

REACH	ALTERNATIVE 6	FUTURE WITHOUT PROJECT
43 feet wide	0.45 HU	0.36 HU
50 feet wide	0.20 HU	0.11 HU
60 feet wide	0.26 HU	0.19 HU

Average habitat values over the 50-year life of the project would increase above the future without project by 0.09 HU in reach 1, 0.09 HU in reach 2, and 0.07 HU in reach 3, respectively. When expressed as a percentage of the long-term average for the future without project, these increases attributable to Alternative 6 amount to 25%, 82%, and 37% higher aquatic habitat value.

Stream bank habitat values: As was true for Alternative 6, use of the term stream bank habitat for Alternative 8 misrepresents that inherent nature of the design and its effects on existing stream bank vegetation. Stream banks are not an element of this design.

Design features of Alternative 8 would diminish the overall quality of this habitat. As before, graphical projections of these numerical results were intentionally foregone in this section because the average for each reach is lower than that for the recommended alternative (Table 10-14).

Table 10-14. Average of projections of habitat quality, in habitat units, of the "stream bank habitat" in Lower Mission Creek for Alternative 8.		
REACH	ALTERNATIVE 8	FUTURE WITHOUT PROJECT
43 feet wide	0.07 HU	0.24 HU
50 feet wide	0.03 HU	0.11 HU
60 feet wide	0.04 HU	0.12 HU

Because this design precludes planting anything between the tops of the stream channel, average habitat values over the 50-year life of the project would decrease within each reach. Reach 1 would lessened by 0.17 HU, reaches 2 and 3 would both be lower by 0.08 HU in habitat quality. When expressed as a percentage of the long-term average for the future without project, these reductions attributable to Alternative 8 amount to -71%, -73%, and -67%, respectively.

Replacement of canopy trees: Alternative 8 is exactly parallel to Alternative 6 in regard to replacement of trees lost during construction. Therefore, Alternative 8 also would yield a minimum of 104 trees appropriate to this habitat..

Endangered species: The excavation requirements for this alternative also are precisely the same as those for the recommended design. All environmental commitments and mitigation features for Alternative 12 would be exactly applicable to Alternative 8. The expected long-term consequences of Alternative 8 on both steelhead and tidewater gobies would be identical to those expected for Alternative 12.

Moreton Bay Fig: Alternative 8 could be accomplished without any effect of any kind to this tree.

R 10.5.3.2 **Summary**:

Table 10-15 summarizes the numeric projections from the HEP analysis (Appendix C) of aquatic habitat and stream bank habitat under the No Action Alternative and Alternative 8, and differences between the two regarding endangered species, native trees, and the Moreton Bay Fig Tree.

Table 10-15. Long-term expectations regarding biological resources in Lower Mission Creek for Alternative 6 and the future without project, Alternative 1. Where habitat values are concerned, numbers are given in habitat units, HU. Numbers enclosed within brackets are the difference between projections for Alternative 6 and Alternative 1.

	Alternative 12	Alternative 1
aquatic habitat	0.91 HU {net yield of 0.25 HU}	0.66 HU
stream bank habitat	0.14 HU {net reduction of 0.33 HU}	0.47 HU
Totals	**1.05 HU {net reduction of 0.08 HU}**	**1.13 HU**
steelhead and tidewater goby	incidental impacts fully mitigated by structural features and environmental commitments	no foreseeable incidental impacts
native trees which contribute to a riparian canopy	at least 104 healthy trees of several species would be established after 5 years	no additional trees would be anticipated
Moreton Bay Fig Tree	unaffected by construction or maintenance	unaffected

Residual Impacts: Implementation of Alternative 8 would result in a net reduction equivalent to 0.33 habitat units attributable to loss of stream bank vegetation when compared to the future without project. On balance, Alternative 8 would induce a combined net loss equivalent to 0.08 habitat units when compared to the future without project.

SECTION - 11 - LAND USE

The existing land use data is prepared based on a field survey of Lower Mission Creek and the surrounding Study Area. The City of Santa Barbara's General Plan, Local Coastal Plan and Municipal Code were reviewed to identify the designated land uses within the project area. City of Santa Barbara Staff was contacted concerning the project's potential land use impacts and consistency with applicable plans and policies. Information has been summarized in this section from the Plans and Policies of the City of Santa Barbara. The details of the relevant Goals and Policies and the project's potential consistency or inconsistency with them are provided in Section 4.

11.1 EXISTING AND FUTURE LAND USE

11.1.1 Existing Land Use

Current land uses in the study area and in the vicinity of the project site consist of the highly urbanized downtown area, single-family, duplex and multiple-family residences, businesses, some industries, and public property (including parks) adjacent to the creek. In many areas, homes and businesses are immediately adjacent to the creek banks, but limited open space still exists in some reaches.

There is very little vacant land that is useable for development within the project area. Most of the vacant land is owned by either Santa Barbara County or the Santa Barbara County Flood Control District and is intended as creek right-of-way. Immediately north of the freeway, the State of California owns a remnant parcel, left over from the construction of the Crosstown Freeway. Union Pacific Railroad also owns a vacant parcel adjacent to Moreton Bay Fig Tree Park on Montecito and Chapala Streets. There are also a few privately owned vacant parcels scattered throughout the project area.

The remainder of the properties in the project area has been developed in one way or another. Many of the residentially zoned parcels are developed to the maximum density allowed by the zone and their lot size. This is also true for much of the area zoned for commercial or hotel and related commerce uses.

11.1.2 Site Specific Land Use Setting

The project area extends from Canon Perdido Street to Cabrillo Boulevard. As stated in the above discussion, the project area mainly consists of residential, commercial, industrial and open space uses. Based on these categories, the project area is divided into three sections to identify site specific land uses.

11.1.2.1 Canon Perdido Street to Gutierrez Street:

Within this reach, the predominant land use is residential. In many cases, residential units are located very close to or are even part of the creek bank. A few retail businesses are located on Haley and Gutierrez Streets. At the crossing of Castillo and Canon Perdido Streets, a

church is located with a large parking lot. Next to the parking lot, open space is available which could be used as a primary staging area during project construction.

11.1.2.2 Gutierrez Street to Mason Street:

From Gutierrez Street downstream, the creek course meanders and an oxbow is located between Gutierrez and Mason Streets. This area can be characterized as having a mix of land uses, consisting of open land, residential dwellings, commercial uses and transportation-related uses. Some of the existing residential structures are in poor condition. Union Pacific Railroad is located within this reach, including the railroad station for the area. This historic station has recently completed a significant renovation. The famous Moreton Bay Fig tree, one of the largest examples of its type in the world, is located at the intersection of Montecito and Chapala Streets. Between the railroad and Mason Street is an attractive older neighborhood in substantially original condition. This area is a remnant of the early 20th century residential development in the Waterfront area.

11.1.2.3 Mason Street to Cabrillo Boulevard:

This reach of the project area mainly consists of retail commercial uses, hotels and motels, with some public facilities. The nearby beach area is excellent for tourism and related businesses. The building architecture in this area is characterized by a variety of Spanish Colonial Revival and similar styles, which merges into an attractive residential area of single and multiple family dwellings behind Cabrillo Boulevard.

11.1.3 Zoning Designations

Zoning designations vary throughout the project area. See Figure 11.1 for a zoning map. The applicable zones include the following:

- C-2 - General Commerce
- R-3 - Multiple-Family
- R-4 - Hotel, Motel, Multiple Family
- P-R - Park and Recreation
- HRC-2 - Hotel and Related Commerce 2
- S-D-3 - Coastal Overlay Zone

General Commerce (C-2) zoning is located at the upstream end of the project area, adjacent to Carrillo Street, along the 100 block of West Gutierrez Street, the 400 block of De la Vina Street and on Chapala Street between the freeway and the railroad tracks. Residential (R-3 and R-4) zoning is located on all of the properties between the Commercial zoning along Carrillo Street and Haley Street as well as on properties west of Mission Creek south of the freeway. Park and Recreation (P-R) zoning is confined to the Moreton Bay Fig Tree Park located at the southwest corner of Chapala and Montecito Streets and the beach area south of Cabrillo Boulevard. The Hotel and Related Commerce 2 (HRC-2) zoning applies to properties on the easterly side of Mission Creek south of the freeway as well as along Cabrillo Boulevard west of Mission Creek. The Coastal Overlay Zone applies to all properties south of the freeway.

11.1.4 General Plan Land Use Designations

The General Plan Land Use designations generally match the zoning in the project area. The areas zoned R-3 and R-4 north of the freeway are designated as Residential, 12 units per acre, in the General Plan. The area zoned R-4 south of the freeway is designated Hotel and Residential. The areas zoned P-R are designated as park space. The areas zoned C-2 are designated as General Commerce. The areas zoned HRC-2 are designated as Hotel and Related Commerce II on the General Plan Map. The creek itself is designated as Buffer/Stream, but the zoning is the same as that for the land uses adjacent to it. In addition, the Central City Redevelopment Plan designates Mission Creek for Flood Control and Open Space.

11.2 SANTA BARBARA CITY CHARTER

The City of Santa Barbara is a Charter City which means that, instead of following all of the general rules established by the State for cities, the City has elected to establish its own set of rules to the degree allowed by State law. The Charter was established by a public vote. Amendments to the Charter are also subject to approval by a vote of the citizens of Santa Barbara. A brief discussion of the pertinent Charter Sections follows.

11.2.1 Charter Section 1507

On November 2, 1982, voters in the City of Santa Barbara approved Measure K that became Section 1507 of the City Charter. This section states:
"It is hereby declared to be the policy of the City that its land development shall not exceed its public services and physical and natural resources. These include, but are not limited to, water, air quality, wastewater treatment capacity, and traffic and transportation capacity. All land use policies shall provide for a level and balance of residential and commercial development which will effectively utilize, but will not exhaust, the City's resources in the foreseeable future. In making land use decisions, the City shall be guided by the policies set forth in this section. In furtherance of these policies, no amendments to the City's General Plan and Zoning Ordinance shall be effective unless approved by five (5) affirmative votes of the City Council. Upon such approval, General Plan and Zoning Ordinance amendments shall be conclusively presumed to comply with the policies set forth herein."

This project is potentially consistent with Charter Section 1507 since it does not result in a significant long-term impact on City resources and no amendments to existing City policies are needed.

11.2.2 Charter Section 1508

This Charter Section was approved by the voters as Measure E on November 7, 1989 and was amended in November 1996. The Section limits the amount of nonresidential square footage

that can be constructed in the City until January 1, 2010. Because this project does not involve any increase in habitable non-residential square footage, it is potentially consistent with Charter Section 1508.

11.3 CITY OF SANTA BARBARA GENERAL PLAN AND LOCAL COASTAL PLAN GOALS AND POLICIES

The City's adopted General Plan is required by State law and contains a number of Elements that specify policies that relate to the proposed project. A brief discussion of applicable policies is provided below. Policies related to specific impact areas included in this EIS/EIR are discussed in Section 4, Plans and Policies, and in the individual sections on these issues. These include the following:

- Section 7, Geology – Policies from the Seismic Safety/Safety Element
- Section 8, Water Resources – Policies from the Conservation Element and the Local Coastal Plan
- Section 9, Air Quality – Policies from the Conservation Element
- Section 10, Noise – Policies from the Noise Element
- Section 11, Biological Resources – Policies from the Conservation Element and the Local Coastal Plan
- Section 13 – Socioeconomics – Policies from the Land Use and Housing Elements
- Section 14, Aesthetics/Visual Resources – Policies from the Conservation Element and the Local Coastal Plan
- Section 15, Recreation – Policies from the Parks and Recreation Element and the Local Coastal Plan
- Section 16, Hazardous, Toxic and Radioactive Waste – Policies from the Circulation Element, the Hazardous Waste Management Plan and the Local Coastal Plan
- Section 17, Traffic – Policies from the Circulation Element
- Section 18, Safety – Policies from the Seismic Safety/Safety Element
- Section 19, Cultural Resources – Policies from the Conservation Element
- Section 20, Utilities – Policies from the Circulation Element and the Local Coastal Plan

Several Elements of the Santa Barbara General Plan (Open Space Element, Conservation Element, and Seismic Safety/Safety Element) and the City's Local Coastal Plan (LCP) are applicable to this project in terms of land use issues. These plans state the City's desire to maintain and enhance, as much as possible, the biological and aesthetic qualities of natural drainage channels. They also include policies regarding development standards along City creeks.

11.3.1 Land Use Element

The Land Use Element defines the existing and future layout of development in the City. There are two sections of the Land Use Element: the Land Use (or General Plan) Map and the

text. The Map shows Land Use Designations for the City; the text discusses what these designations mean in more detail and often includes a discussion of differences in emphasis for areas with the same designation in different areas of the City. The Land Use Map designations are discussed in Section 11.2 above. The Land Use Element allows for the ongoing development of the project area in the designated land uses.

11.3.2 **Open Space Element**

The Open Space Element policy for creeks states that "it is recognized that certain maintenance, clearing and alignment work may have to be done in order to minimize flood damage. However, all such flood control work should be done in a manner that will maintain the natural qualities of the creek and preserve open space. Further artificial channelization and/or lining, in any form, must not occur." See Section 4 for a discussion of the project's potential for consistency with the Open Space Element.

11.3.3 **Seismic Safety/Safety Element**

The Seismic Safety/Safety Element policy for flooding recommends that setbacks or buffer zones be established to protect new development from flooding. In addition, policies on ground shaking, liquefaction and erosion require that projects planned where such conditions occur be designed to withstand or avoid resulting impacts. See Section 4 for a discussion of the project's potential for consistency with the Seismic Safety/Safety Element.

11.3.4 **Conservation Element**

The Conservation Element goals for visual resources include the goal to "restore where feasible, maintain, enhance and manage the creekside environments within the City as visual amenities, where consistent with sound flood control management and soil conservation techniques." Under Biological Resources, the Conservation Element calls for removal of artificial hard bottoms. See Section 4 for a discussion of the project's potential consistency with the Conservation Element.

11.4 LOCAL COASTAL PLAN

The Local Coastal Plan (LCP) applies to the coastal areas of the City. It is required by the California Coastal Act of 1976 and is based on the Coastal Initiative of 1972. Its primary purposes are to protect coastal resources, assure that coastal-dependent uses have a high priority in the coastal area and protect access to the California Coast by residents of and visitors to California.

The reader should be aware of the fact that the Local Coastal Plan supersedes and refines the General Plan for those areas of the City that lie within the Coastal Zone. Where elements of the General Plan do not specifically refer to this type of project, the reader should consider the language of the LCP as providing additional specificity and policy direction.

Three general policies guide the LCP, as follows:

1.1 The City adopts the policies of the Coastal Act (Public Resources Code Sections 30210 through 30263) as the guiding policies of the land use plan.

1.2 Where policies within the land use plan overlap, the policy which is the most protective of resources, i.e., land, water, air, etc., shall take precedence.

1.3 Where there are conflicts between the policies set forth in the land use plan and those set forth in any other element of the City's existing General Plan or existing regulations, the policies of the land use plan take precedence.

More specific discussion of the LCP and the project's consistency with it is included in Section 4 on Plans and Policies.

11.5 ENVIRONMENTAL CONSEQUENCES ON LAND USE

Impacts to land use would be considered significant if the proposed alternatives would result in a substantial loss of open space or impacts on biological and aesthetic qualities of natural drainage or channel capacity. In addition, land use impacts would be considered significant if the proposed alternatives would be incompatible with surrounding land uses; for example, potential land use incompatibilities can occur from project generated impacts such as an adverse visual effect.

The proposed project is generally consistent with the goals and policies and programs of the City of Santa Barbara General Plan and Policies because proposed project construction would not exceed its public services and physical and natural resources. The purpose of the project is to provide flood control to the City of Santa Barbara and to protect life and property located within the 15 to 20 year floodplain. The project has been designed to return the Creek to a more natural state as much as possible, including a reduction in the extent of concrete channel bottom. Certain specific design standards are required for sideslope protection to provide more protection to the creek bank property during flood events.

Section 4, Plans and Policies, includes the City of Santa Barbara General Plan and Local Coastal Plan Goals and Policies applicable for each resource.

11.5.1 Alternative - No Action Alternative No. 1 (Without Project Conditions)

Within the project reach, no open space or agricultural lands exist in the right-of-way, and no impacts to existing land uses would occur because there would be no project construction. The property located along the creek banks and in the flood plain would continue to be damaged by flooding in the future. In addition, no ongoing maintenance standards would be established and there would be no reduction in the amount of hard channel bottom. There would also be no improvements to the aesthetic or biological values of the creek.

11.5.2 Alternative 12: 3400 cfs Capacity, With Oxbow Bypass, Stabilized Sides Using Predominantly A Combination of Riprap Slopes Above Short Vertical Walls

R Implementation of Alternative 12 would require complete removal or relocation of 10 whole structures and removal of three (3) partial structures. Table 11.6 -1 identifies removal of structures by alternatives and types. Most of the structures are residential and some are commercial.

Due to removal of structures, the existing land use would change from residential/ commercial to natural creek bed or open space on most of those properties. Most improvements on these properties are old and would be subject to flooding in the future. See Section 12, Socioeconomics, for further discussion regarding the loss of housing and relocation issues. Impacts to land use are adverse but not significant, because these buildings are subject to flooding and they would be damaged by future flooding. The project purpose is to provide flood protection to the property located within the flood plain. However, it should be noted that some of the affected structures are historic and removal or relocation of those structures would have historic resources impacts (See Section 19, Cultural Resources, for analysis of those impacts).

Implementation of Alternative 12 would not have significant impacts on land use because there would be an increase in open space and biological and aesthetic qualities of the creek would be enhanced. Vegetation would be planted along the riprap walls. Planting of vegetation would improve the visual/aesthetic quality of the creek. From a visual/aesthetic point of view, vegetated riprap construction is superior, and would enhance the natural values of the creek and its surrounding land uses. The altered land use will be compatible with the surrounding land uses.

11.5.3 Alternative 6: Vertical walls without oxbow bypass

Implementation of Alternative 6 would have adverse impacts on land use compared to the stepped wall (Alternative 8) and vegetated riprap (Alternative 12) alternatives. Alternative 6 would require the removal or relocation of seventeen (17) complete structures, including fifteen (15) complete structures, and two (2) partial structures.

Implementation of this alternative would result in vertical concrete walls for the entire project reach. Vertical walls would not enhance the aesthetic or natural appearance of the creek and would not enhance surrounding land uses, although flood protection would be improved. This alternative could result in significant impacts on land use due to the loss of aesthetic values.

11.5.4 Alternative 8: Combination of stepped and vertical walls with oxbow bypass

Alternative 8 would require the removal of 16 structures, including fourteen (14) complete structures and three (3) partial structures. While the stepped walls would allow some planting, it would not be possible to create the full range of riparian habitat that would occur with the vegetated riprap included in Alternative 12. The narrow space between the stepped walls would limit the potential growth of trees planted between the walls, thus limiting the potential habitat created by the project. While this alternative might result in some enhancement of the surrounding land uses, it would not be as great as that provided by Alternative 12.

R

TABLE 11.6-1
RELOCATION OF STRUCTURES

Type of Structure	Alternative 6	Alternative 8	Alternative 12
Commercial Building	1 (Whole Take) 1 (Partial Take)	1 (Whole Take) 1 (Partial Take)	2 (Whole Take) 1 (Partial Take)
Small Apartment Building	1 (4 units)	1 (4 Units)	1 (4 Units)
Residential Building	9 *	6*	4 (Whole Take)
Patio Deck	1	1	1
Garage	3	3	3
Metal Structure	1 1 (Partial Take)	0	0
Railroad Station Platform/ Tack	1 Partial Take)	2 (Partial Take)	2 (Partial Take)
Total Structures	17 (Whole Take) 2 (Partial Take)	14 (Whole Take) 3 (Partial Take)	10 (Whole Take) 3 (Partial Take)

* Two of the residences may be relocated on their lots instead of being destroyed.

11.6 FUTURE MAINTENANCE

Future maintenance activities would not have any significant impact on existing land use resources. The activities would be confined mainly to the creek bottom or banks. No removal of any buildings is involved in annual maintenance.

11.7 GROWTH INDUCEMENT

Future development in the project area is expected to consist of intensifying existing development on those residentially zoned properties that have remaining development potential. Privately owned vacant parcels will also be expected to have development on their sites in the long term. Redevelopment of commercial properties will be expected to occur in the Waterfront Area as the economy allows. Development of additional square footage for non-residential properties is limited by the City Charter, General Plan and Zoning Ordinance to 3,000 square feet per parcel, in most circumstances.

Future residential development is not expected to be significantly affected by the channelization of lower Mission Creek. The channelization will primarily allow for more flexibility in development since flood elevations are expected to drop. The available build-out under zoning for parcels directly affected by Mission Creek is roughly 75 units. Additional buildout potential exists for other residential parcels within the floodplain.

The proposed project will not have a direct impact on development potential in the affected area in terms of the amount allowed by the City's General and Local Coastal Plans or zoning. However, because of the avoided costs of flood insurance and special project design, more development may occur than would be the case without the project.

Much of the area zoned for commercial and hotel-related uses is also developed to the capacity allowed by zoning when on-site parking requirements are considered; however, substantial redevelopment of the sites with a limited amount of additional commercial development could occur. The area most impacted by the channelization of the creek will be the Waterfront Area. This is an area that is on the verge of major changes from its former service commercial, auto dealer and light manufacturing emphasis to a visitor-serving commercial emphasis that draws tourists into the area. The appearance of the creek and its incorporation into the area could have a pronounced effect on how this redevelopment occurs and its extent. However, most recently approved developments along the creek have incorporated potential flood control and habitat restoration improvements into their designs in anticipation of this project.

11.8 COASTAL ZONE MANAGEMENT ACT CONSISTENCY REQUIREMENTS

The federal Coastal Zone Management Act requires that, if a state has its own coastal protection laws, a finding be made that the federal project is consistent with that act. The proposed project area is located within the Coastal Zone of the State of California and the City of Santa Barbara. It is, therefore, subject to compliance with the California Coastal Act of 1976 and the City of Santa Barbara Local Coastal Plan. To comply with the Coastal Zone Management Act, the USACOE will coordinate with the California Coastal Commission and a Coastal Consistency Determination (CCD) will be prepared to comply with this Act.

The Local Coastal Plan (LCP) applies to the coastal areas of the City. It is required by the California Coastal Act of 1976 and is based on the California Coastal Initiative of 1972. Its primary purposes are to protect coastal resources, assure that coastal-dependent uses have a high priority in the coastal area and protect access to the California Coast by residents of and visitors to California. Applicable policies of the California Coastal Act of 1976 and LCP are evaluated in the CCD. Evaluation of public access, recreation, and impacts to the marine environment would be included in the CCD. A copy of the draft CCD is included in Appendix D.

11.9 RESIDUAL IMPACTS:

No residual land use impacts are expected under Alternative 12 or Alternative 8, although Alternative 12 will result in greater land use benefits. Construction of Alternative 6 could result in significant adverse unavoidable effects on land use.

SECTION - 12 - SOCIOECONOMICS

12.1 EXISTING CONDITIONS

Living in Santa Barbara is a rare combination of small town charm and big city advantages. The year-round climate averages a summer maximum of 72° and a minimum of 56°, with winter averages of 66° and 47°, respectively. The average annual rainfall is 18 inches, and air quality is generally good. The cost of living is similar to the more prosperous suburbs of Los Angeles and other major cities. Food and other staple items are about the same; rent, luxuries, gasoline, and services are slightly higher.

R The South Coast region of Santa Barbara County includes the entire commercial, industrial, and residential area along the southernmost strip of the county from Gaviota, in the west, to Carpinteria, in the east, an area known locally as the South Coast. The current population of Santa Barbara County is 409,048. The City of Santa Barbara has a current population of 91,909. (Official State Estimates, California Department of Finance, January 1, 1999.)

The county seat is located in Santa Barbara and, together with the University of California, the two state organizations represent the largest employers in the region. High technology, manufacturing, tourism, education, and many professional services are the principal sectors of the South Coast economy.

12.1.1 Employment

The industry employing the largest number of people along the South Coast is the broadly based services sector. The principal services include business services, medical and healthcare services, and education. Prominent service industries that support tourist activities are recreation and amusement, hotels and lodging, and local transportation services.

The growth in retail trade employment has now turned positive. As the local economy recovers, both the services and retail sectors are expected to create new jobs this year and next, but at a slower rate than the past two years (The 1999 Economic Santa Barbara County Outlook, UCSB Economic Forecast Project, April 1999). Many small companies from the Los Angeles area are relocating along the South Coast of Santa Barbara County. The Santa Barbara Municipal Airport, which provides airline service to most of Santa Barbara County, has had increases in passenger counts for the last several years, except for 1998. The Airport was closed for several days in February and March due to heavy rains and flooding caused by El Niño (Karen Ramsdell, Director, Santa Barbara Municipal Airport).

Table 12.1-1 shows historic and projected employment data by sector for Santa Barbara County since 1980. Based on these statistics, about 80% of the total population is engaged in Services, Government Employment, Trade (mainly retail trade), and manufacturing. Agriculture, mining, construction, and real estate make up the remaining 20% of employment. Retail trade and services are the main occupations, primarily due to tourism.

TABLE 12.1-1
HISTORIC AND PROJECTED EMPLOYMENT BY SECTOR
SANTA BARBARA COUNTY, 1980-2010
(Page 1 of 2)

Sector	**Historical – Persons Employed**				**1980-1990**		**1990-1998**		**1980-1998**	
	1980	*1990*	*1997*	*1998*	*Average Annual Change*	*Annual Growth Rate*	*Average Annual Change*	*Annual Growth Rate*	*Average Annual Change*	*Annual Growth Rate*
Agriculture	7,400	11,200	14,733	13,100	380	4.2%	238	1.7%	317	3.7%
Min., Oil & Gas Ext.	1,500	1,100	1,033	800	(40)	-3.1%	-38	-3.1%	-39	-2.2%
Construction	5,000	6,400	6,667	6,767	140	2.5%	46	0.7%	98	1.4%
Manufacturing	19,200	21,400	17,083	17,817	220	1.1%	-448	-1.7%	-77	-0.4%
Durable Goods	15,700	17,600	12,222	13,267	190	1.1%	-542	-2.8%	-135	-0.5%
Nondurable Goods	3,500	3,800	4,375	4,550	30	0.8%	84	1.8%	58	1.2%
Trans & Pub Utilities	5,100	5,200	5,417	5,242	10	0.2%	5	0.1%	8	0.2%
Wholesale Trade	4,000	5,600	5,075	5,200	160	3.4%	-50	-0.5%	67	1.2%
Retail Trade	25,100	29,300	31,475	32,208	420	1.6%	364	0.8%	395	1.1%
Fin, Insur, Real Estate	5,700	8,100	7,208	7,558	240	3.6%	-68	-0.5%	103	1.4%
Services	30,500	41,900	46,525	47,250	1,140	3.2%	669	1.1%	931	2.7%
Government	24,600	29,300	30,833	31,833	470	1.8%	317	0.7%	402	1.2%
Total	**128,000**	**159,500**	**166,049**	**167,775**	**3,140**	**2.2%**	**1,034**	**0.3%**	**2,210**	**1.3%**

Source: State of California Employment Development Department, Labor Market Division; Santa Barbara County Association of Governments, Regional Growth Forecast 94; The 1999 Santa Barbara County Economic Outlook, UCSB Economic Forecast Project, April 1999.

TABLE 12.1-1
HISTORIC AND PROJECTED EMPLOYMENT BY SECTOR
SANTA BARBARA COUNTY, 1980-2010
(Page 2 of 2)

Sector	PROJECTED – Persons Employed			1995-2000	2000-2005	2005-2010
	2000	*2005*	*2010*	*Annual Growth Rate*	*Annual Growth Rate*	*Annual Growth Rate*
Agriculture	12,942	14,000	14,900	2.7%	1.6%	1.3%
Min., Oil & Gas Extr.	1,122	1,153	1,181	0.7%	0.6%	0.5%
Construction	7,210	7,918	8,500	3.9%	1.9%	1.4%
Manufacturing	20,300	21,100	21,700	0.8%	0.8%	0.6%
Durable Goods	NA	NA	NA	NA	NA	NA
Nondurable Goods	NA	NA	NA	NA	NA	NA
Trans & Pub Utilities	5,800	6,150	6,400	1.4%	1.1%	0.8%
Wholesale Trade	5,450	5,600	5,700	0.8%	0.5%	0.4%
Retail Trade	31,200	34,000	36,000	2.0%	1.7%	1.2%
Fin, Insur, Real Estate	8,400	8,700	9,000	0.8%	0.7%	0.7%
Services	48,200	52,200	56,000	1.6%	1.6%	1.4%
Government	31,720	33,650	35,500	1.6%	1.1%	1.1%
Total	**172,344**	**184,471**	**194,381**	**1.7%**	**1.4%**	**1.1%**

Source: State of California Employment Development Department, Labor Market Division; Santa Barbara County Association of Governments, Regional Growth Forecast 94; The 1999 Santa Barbara County Economic Outlook, UCSB Economic Forecast Project, April 1999.

12.1.1.1 **Retail Sector:**

During 1998, retail sales in the city of Santa Barbara increased 5.1 percent over 1997 (The 1999 Santa Barbara County Economic Outlook, UCSB Economic Forecast Project, April 1999). The city's largest and newest shopping mall, Paseo Nuevo, which opened in August of 1990, has significantly strengthened the downtown general merchandise retail sector. Other retail markets are now showing clear signs of recovering from the economic recession, particularly automobile and restaurant sales.

The number of retail stores in Santa Barbara continues to grow and is now at an all time record high. Total taxable sales per city resident is one of the highest in the state of California.

12.1.1.2 **Tourism:**

Visitor frequency to the South Coast has continued to rise since 1994. Average hotel/ motel occupancy rates have steadily increased since 1992 and lodging room sales continue to increase. Overall visitor spending is now positively affecting the restaurant and general merchandise retail sector of Santa Barbara. Retail sales rebounded sharply in 1994 and continue to improve. Over 400 restaurants, coffee shops and snack bars serve the area. Some specialize in exotic foreign foods and authentic atmosphere, gourmet dishes, steak or seafood.

The weak U.S dollar is encouraging more foreign visitors to California and the South Coast. Foreign tourists now account for approximately 15 percent of all visitors to Santa Barbara County.

12.1.1.3 **Education:**

The area is acknowledged as an educational center. Its city and county schools rank among the state's best and three major institutions of higher learning are located here: University of California at Santa Barbara, Westmont College, and Santa Barbara City College. Two noted professional schools are in the area as well: Brooks Institute of Photography and the Music Academy of the West.

12.1.2 **Population**

Prior to the 1960's, population in the South Coast area was concentrated in the City of Santa Barbara, with smaller communities located in Carpinteria, Montecito, Summerland and Goleta. While the City of Santa Barbara has experienced growth since that time, more rapid growth has taken place in the surrounding areas such as Goleta Valley. With the establishment of Vandenberg Air Force Base approximately 50 miles northwest of Goleta Valley, and the University of California, Santa Barbara on the southern edge of Goleta Valley, electronic component and research and development industries have been and continue to be attracted to the area.

Future population growth in the City of Santa Barbara is limited, reflecting the mostly complete development of the city area; the lack of large parcels of vacant land limits the development of new subdivisions. The remaining small parcels of vacant land have become very expensive and are not available for large-scale development of low or moderate priced housing. Most new residential construction that is taking place in the City is either custom single family residences or multiple structures, such as condominiums.

Increased growth in the South Coast is impacting adversely on the amenities of life in the area. Increased growth has increased traffic congestion and air pollution problems. Concerns about preserving the quality of life and living within available resources have prompted a strong managed growth philosophy among the residents of Santa Barbara.

Recent population estimates indicate that, while the growth rate increased slightly from 1985 to 1990, the entire Santa Barbara County population continues to grow at a modest pace - about 2.4 per cent per year from 1980 to 1990. However, the City of Santa Barbara grew at slightly more than one-half the county's rate.

Table 12.1.2-1 summarizes population estimates for Santa Barbara County, the City of Santa Barbara and the South Coast area from 1970 to 1990. Future growth is expected to be similar to recent growth.

The period from 1970 to 1980 saw the most rapid rate of growth in the Carpinteria Census County Division (CCD) and the Santa Ynez CCED, moderate growth in the Santa Barbara, Santa Maria, and Guadalupe CCDs, and population loss in the Lompoc and Cuyama CCDs. In the 1980s, population growth at the County level increased dramatically (from 1.24 to 2.15 percent per year, on average). During this period, however, the most rapid growth occurred almost uniformly in the North County. The North County experienced an average rate of 3.36 percent (compared with 1.18 percent the previous decade), while the South Coast experienced a rate of 1.14 percent per year (compared with 1.28 percent the previous decade). The growth rate for the City of Santa Barbara more than doubled (from 0.58 percent to 1.41 percent) between these decades. In the 1990s, the growth rate for the County has averaged 1.19 percent annually, while the growth rate for the City of Santa Barbara has averaged 0.82 percent annually.

Projected growth rates through the year 2010 are forecasted to decline uniformly for all areas in the County. However, growth will be greater in the North County than on the South Coast with the Santa Maria and Guadalupe areas experiencing the highest rates of change.

TABLE-12.1.2-1
POPULATION ESTIMATES
POPULATION CHANGE, 1970-2010

	1970	*1980*	*1990*	*2000*	*2010*	***Average Annual Percent Change***			
						1970-1980	*1980-1990*	*1990-2000*	*2000-2010*
Carpinteria CCD[1]	9,959	15,419	18,120	20,931	22,959	4.47	1.63	1.45	0.931
Carpinteria City	NA	10,835	13,747	15,689	17,624	NA	2.41	1.33	1.17
Unincorporated	9,959	4,584	4,373	5,242	5,335	NA	-0.47	1.83	0.18
Santa Barbara CCD[1]	140,466	155,448	173,247	187,372	202,640	1.02	1.09	0.79	0.79
Santa Barbara City	70,212	74,414	85,571	93,241	100,377	0.58	1.41	0.86	0.74
Unincorporated	70,251	81,034	87,676	94,132	102,263	1.44	0.79	0.71	0.83
Santa Ynez CCD	8,328	14,307	19,504	21,407	22,905	5.56	3.15	0.94	0.68
Buellton City[2]	NA	NA	3,506	3,966	4,344	NA	NA	1.24	0.91
Solvang City	NA	3,106	4,741	5,437	6,046	NA	4.32	1.38	1.07
Unincorporated	8,328	11,201	11,257	12,004	12,515	NA	0.05	0.64	0.42
Lompoc CCD	47,729	44,779	58,476	67,435	73,174	-0.64	2.70	1.44	0.82
Lompoc City	25,284	26,267	37,649	44,208	47,868	0.38	3.67	1.62	0.80
Unincorporated	22,445	18,513	20,827	23,226	25,306	-1.91	1.19	1.10	0.86
Guadalupe CCD	3,858	4,322	6,062	7,561	8,875	1.1	3.44	2.23	1.62
Guadalupe City	NA	3,629	5,479	6,936	8,0202	NA	4.21	2.39	1.69
Unincorporated	3,858	693	583	625	673	NA	-1.71	0.70	0.74
Cuyama CCD	1,212	1,180	1,206	1,355	1,525	-0.27	0.22	1.17	1.19
South Coast[3]	150,425	170,867	191,367	208,303	225,599	1.28	1.14	0.85	0.80
North County[4]	113,899	128,048	128,048	207,911	231,842	1.18	3.36	1.55	1.10
COUNTY TOTAL	264,324	298,915	369,608	416,214	457,441	1.24	2.15	1.19	0.95

Sources: U.S. Bureau of the Census, Census of Population, 1990; *Regional Growth Forecast 94*, Santa Barbara County Association of Governments, Forecast "94"

Notes: 1. Census County Division. 2. Census Designated Place (CDP) in 1990, prior to incorporation. 3. Carpinteria CCD and Santa Barbara CCD combined. 4. Combination of all other CCDs in County is the North County.

12.2 THE CITY OF SANTA BARBARA PLANS AND POLICIES

12.2.1 Housing Element

The Housing Element of the City of Santa Barbara General Plan is focused on the protection, maintenance and provision of adequate housing for residents of and employees in the City, especially for moderate and low income residents.

12.2.1.1 Housing Policy:

Policy 3.5 states that: "The City shall ensure that public projects requiring relocation plans under State or Federal relocation laws shall be coordinated and reviewed by the City. Affordable, decent, safe, and sanitary housing shall be available to those displaced within the City or within the South Coast area. Fair compensation and relocation assistance shall be available to those displaced."

12.3 IMPACTS ON SOCIOECONOMICS RESOURCES

Impacts to socioeconomics would be considered significant if the proposed alternatives would result in substantial loss of jobs, displacement of population, or loss of residences and/or businesses. Significant impacts may also occur if the alternatives would be inconsistent with the existing City of Santa Barbara General Plan and Policies.

12.3.1 Environmental Justice Impacts

A significant environmental justice impact would occur if the project results in disproportionate environmental degradation in low-income/minority communities and does not result in equity of economic benefits of the project in low-income/minority communities.

12.3.2 Housing Impacts

A significant housing impact would occur under NEPA if the housing demand generated by project-related in-migrating population exceeded the available housing supply in the region. Furthermore, displacement of existing housing units by project alternatives could also be considered significant, especially if lost housing is affordable to low and/or moderate income households.

12.3.2.1 **Alternative 1 - No Action Alternative (Without Project Conditions):**

The No Action Alternative would not provide needed flood protection to the City of Santa Barbara. The residential and commercial property located within the 20-year floodplain would continue to be periodically damaged. After each flood, cleanup would be required. Without project conditions would not only result in loss of property but would increase the cost of cleanup also as property values increase over time. The USACOE has performed an economic analysis for the proposed project (see details in Economic Appendix of the Main Report). The 1995 flooding caused significant damage to properties located along the creek. Cleanup costs for both the Lower Mission Creek floodplain and Laguna Drainage Area were calculated at $105,600. With bank erosion, land will continue to be lost along the creek banks. The West Downtown area of Santa Barbara (the area between State and Carrillo Streets and U.S. 101) is one of the poorer areas of the City and would continue to bear a disproportionate burden from flood damage.

12.3.2.2 **Alternative 12:**

Alternative 12 would involve the complete removal of one (1) commercial structure, the partial removal of one (1) commercial structure, the complete removal of five (5) multi-family and four (4) single-family residential units and the removal of some railroad platform. (See details regarding removal of structures in Table 12-1 of Land Use Section).

12.3.2.3 **Alternative 6:**

Alternative 6 would involve the complete removal of one (1) commercial structure, two (2) partial commercial structures, four (4) single-family residential units, five (5) multi-family residential units, one (1) residential patio, three (3) residential garages and one (1) metal structure.

12.3.2.4 **Alternative 8:**

Alternative 8 would involve the complete removal of one (1) and the partial removal of one (1) commercial structure, the complete removal of four (4) multi-family and three (3) single-family residential units, one (1) residential patio, three (3) residential garages and some railroad tracks.

12.3.3 **Conclusion**

The proposed project would result in permanent removal of some buildings and loss of property. Economic analysis has been performed to calculate the value of each structure. The City will be responsible for relocating displaced residents in accordance with local, State, and Federal laws. The City will assure that fair compensation and relocation assistance will be available to those displaced by this project. However, relocation of existing tenants may be difficult due to the cost of housing.

Impacts to socioeconomics are significant and adverse, but these buildings are subject to flooding and would be damaged by future flooding. The project purpose is to provide flood protection to life and property located within the flood zone. Construction of the proposed project would reduce future damage to 104 properties located in the vicinity of the Lower Mission Creek, reducing flood insurance costs and securing property values.

In terms of environmental justice, the situation would improve for the majority of the low to moderate income residents in the project area. This improvement would result from the reduction of future flooding and related damage. Those residents that would be displaced by the project would be relocated at the City's expense in accordance with local, state and federal laws.

12.4 FUTURE MAINTENANCE

Future maintenance activities would retain the capacity of the constructed channel. Therefore, the level of flood protection would not be decreased compared to the existing condition. Future maintenance activities would not have any adverse impact on socioeconomic resource.

12.5 MITIGATION

The City will relocate the families or businesses that would be impacted due to implementation of the proposed project and/or appropriate compensation would be provided to the property owners. The cost of carrying out this mitigation is part of the City's share of project costs and will be carried out in accordance with state and federal relocation requirements. If necessary, the City will work with the Santa Barbara Housing Authority to find affordable housing for tenants of demolished residential units.

12.6 RESIDUAL IMPACTS

With the relocation and/or compensation of the residents and property owners, the residual impact will be adverse, but less than significant.

SECTION - 13 - AESTHETICS/VISUAL RESOURCES

13.1 EXISTING AESTHETIC RESOURCES:

The upper reaches of Mission Creek have a high aesthetic value. The creek is still fairly undisturbed in these areas, and the native riparian habitat enhances the rural community setting. As the creek flows into more developed areas, the trees and vegetation at Oak Park and along the channel provide a greenbelt which contributes to the aesthetic character of Santa Barbara.

Downstream of Canon Perdido Street, Mission Creek passes through a highly urbanized section of the City of Santa Barbara. Existing banks have been stabilized by property owners as observed during field visits. These banks have been stabilized by using: stacked sand bags or concrete bags; dumped rocks with soil packed between them; sprayed concrete surfaces; grouted stone; jointed masonry walls; wooden pilings or bulkheads; and sandstone walls. The slopes of creek banks vary from vertical to gentle throughout the project reach. Some residents view the lagoon as little more than a cesspool, especially in the summer when tidal exchange is limited or non-existent. They refer to the creek in this area as a "drainage ditch" or "sewer lagoon." See photos #1-#4, which provide examples of existing degraded aesthetic resources along the project reach.

Litter is common in the creek and adjacent areas, and increases in magnitude proceeding south along the creek. Some residents value the lagoon and other areas of the creek for their recreational and biological resources, especially considering the scarcity of natural creeks in urban settings in southern California. They also value the "buffer zone" between residences and businesses created by the creek. Vegetated banks also block lights from structures and street lamps located across the creek. Sounds from the creek are also pleasing to many residents. These sounds include the "singing" of frogs and birds, and water flowing over rocks.

Photo #1 - Looking downstream at Haley Street. Note vertical walls and varied fence treatments.

Photo #2 - Looking downstream at Gutierrez Street at the beginning of the oxbow. Note concrete channel sides and bottom.

Photo #3 - Looking downstream from Yanonali Street. Note varying wall treatments on right and invasive giant reed on left.

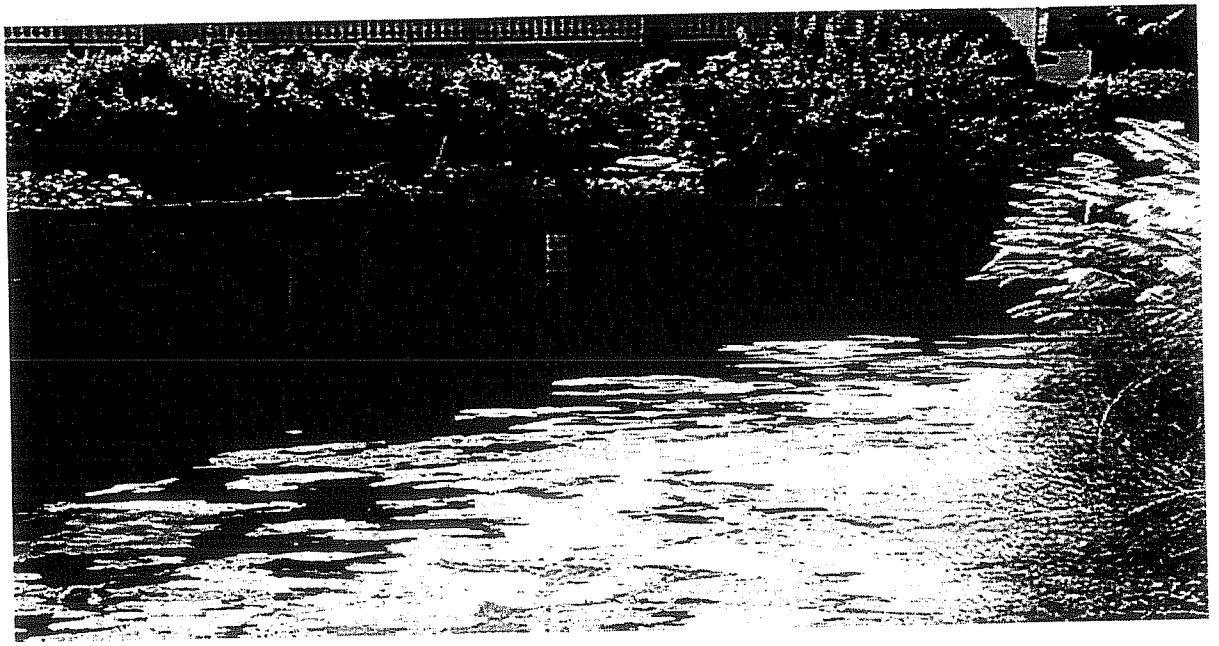


Photo #4 - Looking upstream from State Street. Note timber bulkhead on the left.

13.2 CITY OF SANTA BARBARA VISUAL RESOURCES GOALS AND POLICIES:

Conservation Element Visual Resources Goals:

- *Restore where feasible, maintain, enhance and manage the creekside environments within the City as visual amenities, where consistent with sound flood control management and soil conservation techniques.*

- *Protect and enhance the scenic character of the City.*

- *Maintain the scenic character of the City by preventing unnecessary removal of significant trees and encouraging cultivation of new trees.*

- *Protect significant open space areas from the type of development which would degrade the City's visual resources.*

Visual Resources Policies:

1.0 *Development adjacent to creeks shall not degrade the creeks or their riparian environments.*

4.0 *Trees enhance the general appearance of the City's landscape and should be preserved and protected.*

5.0 *Significant open space areas should be protected to preserve the City's visual resources from degradation.*

13.3 IMPACTS ON VISUAL RESOURCES:

Impacts on visual resources would be considered significant if the project would substantially degrade visual resources or alter or obscure public views of visual resources. Significance criteria include:

- Visibility - the extent to which the physical changes brought about by the project could be seen by the public.
- Number of viewers - the number of people who could potentially see the changes brought about by the project.
- Dominance - the extent to which the project element would dominate the view.
- Setting character - the extent to which the changes would be compatible with the character of the setting.

The first step in this analysis was to define the project viewshed and then identify and describe the viewers within that study area. The description includes type of view (e.g., urban or rural), length of view (e.g., nearby or distant), and duration of view (e.g., intermittent, obstructed, or unobstructed). The viewshed for this project and visibility for surrounding land uses are defined in Section 13.1. ("Existing Aesthetics Resources"). Viewers were classified as *sensitive* or *not sensitive*, and sensitive viewers were evaluated for changes to their view experience.

The proposed action was also addressed in terms of conformance with the pertinent policies and guidelines regarding aesthetics and visual quality from the General Plan of the City of Santa Barbara.

Sensitive viewer types would be similar for each of the alternatives, because the project reach is the same for each alternative evaluated in this section.

Visual sensitivity is dependent upon viewer attitudes, the types of activities in which people are engaged when they are viewing the project, and the distance from which the project would be seen. Overall, higher degrees of visual sensitivity are correlated with areas where people live, are engaged in recreational outdoor pursuits, or participate in scenic or pleasure driving. Conversely, visual sensitivity is considered low to moderate in industrial or commercial areas where the scenic quality of the environment does not affect the value of the activity.

For this project, sensitive viewers are considered to be the residents of Santa Barbara throughout the project reach, and tourists visiting the city from around the world. Commercial employees engaged in their jobs in the vicinity of the State Street and motorists traveling along the surface streets throughout the project reach are called out as intermittent viewers and are, therefore, not considered sensitive.

13.3.1 **Alternative 1-No Action (Without Project Conditions)**:

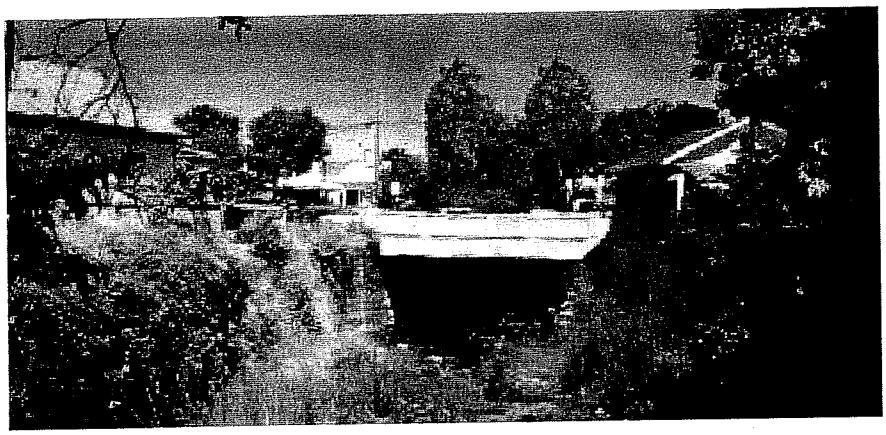
The No Action Alternative would not alter existing aesthetic resources. Existing vegetation would be preserved. However, there are negative aesthetic qualities existing along Lower Mission Creek, including trash accumulation and stagnant ponds and the various creek bank treatments.

13.3.2 **Alternative 12:**

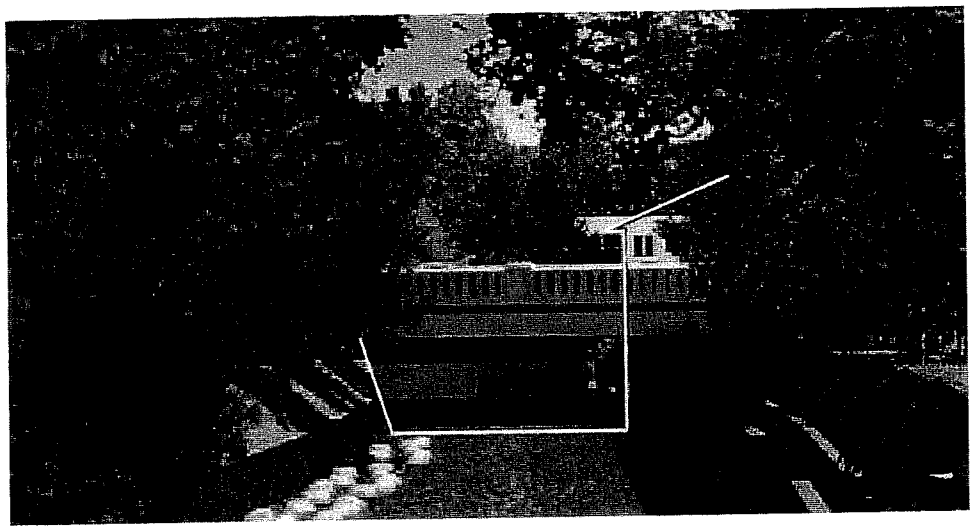
Mission creek flows within the densely populated area of the City of Santa Barbara. The residents of Santa Barbara are very sensitive about the environmental resources and aesthetics of the city, in this case, of the creek. Part of the project objective is to improve environmental conditions. The existing aesthetics or visual quality of the project area would be improved substantially throughout the project reach compared to existing conditions. With the implementation of this alternative, the natural creek bottom would be maintained and extended, and creek banks would be stabilized with a combination of vertical wall and riprap. The bottom half of the bank would consist of two to six foot tall vertical walls, while the upper half would be built with riprap at a 1.5:1 (H:V) slope. The riprap would be covered with topsoil while concrete pipes in varying sizes (up to a maximum of three feet in diameter) would be strategically placed in between the riprap to allow planting of native trees and vegetation. It is expected that planted vegetation along riprap would improve visual characteristics of the project area, after the plants/trees achieve their typical growth form. Refer to photograph of Ortega street Bridge, looking upstream from Bath Street Bridge and "photosimulations" provided in this Section.

Aesthetic values would be increased by planting native riparian types of vegetation on the upper slope of the creek. Establishment of vegetation on the creek banks would enhance aesthetic values of the project area compared to other alternatives and existing conditions. Vertical walls would not be visible to people walking along the creek banks, as the upper banks would be covered with vegetation. Aesthetic treatment would be applied to visible lower banks to minimize impacts of the vertical walls. During the public scoping meeting, people voiced their concerns regarding aesthetic resources located within the project area. The new constructed channel would be pleasing and more natural looking. Their concerns are addressed by implementation of this alternative. The visual quality of the project reach would have positive impacts on tourists visiting the City of the Santa Barbara. Within a few years, planted vegetation would be mature, and trees would increase the visual value of the project area. Lower vertical walls may not be visible to people walking on a side of the creek banks due to the vegetation growth on upper banks. It should be noted, however, that full height vertical walls would be used for most of the distance between State and Mason Streets. These walls would also receive aesthetic treatment, including the use of colored concrete and forms that would mimic the appearance of sandstone or natural vertical creek banks.

Army Corps of Engineers Proposed Project
Lower Mission Creek - Photosimulation
Looking North to Ortega Street Bridge



Top: Existing Condition



Middle: Partial Completion of Photosimulation
(creek bottom, walls, and slopes not yet covered with vegetation)
White lines show existing channel and house.

Bottom: Completed Photosimulation

Comments:

Features visible in before and after views:

- **Two trees behind bridge**
- **Base of left creek wall**
- **House on north side of Ortega Street (right of bridge)**

Significant changes from before to after:

- **House on right removed with project**
- **Natural creek bottom widened from 30 feet to 42 feet**
- **Trees on creek bank hide house on left from view**

Five habitat expansion zones would be created along the creek bank where vacant land is available. This alternative provides the opportunity to construct a sixth habitat expansion zone of about 0.6 acre (25,800 square feet) in the vicinity of the oxbow formation area, on Caltrans property between Highway 101 and Gutierrez Street. If clean-up of contaminated material were to occur prior to project construction, the identified sixth habitat expansion zone area would be planted with native riparian vegetation. The habitat zones also would be planted with native riparian species. These parcels are small, but they would make a significant difference in the City of Santa Barbara, where land is very limited and land value is very high. These viewing areas could be located on the upper bank of the channel, taking the form of pocket or strip parks, could be situated on bridges overlooking the creek bed or could simply consist of seating areas placed along the channel where space and the need exist. These features would enhance the significantly degraded visual quality of the creek area. This would be a beneficial impact. Public concerns have been incorporated to the maximum extent.

No gallery of tree tops exists within the project boundary, although there are individual stately native trees at various locations along the creek. Similarly, no layer of shrubby native plants, normally found beneath a tree canopy in its natural setting, grows along this section of Mission Creek. In addition, urban refuse is a very common sight throughout the project area. Given the limited right-of-way, and availability of land for the project, this project alternative provides maximum visual quality for the project reach. The visual resources would be improved significantly by implementation of the proposed project. In comparison to the existing condition, the project would result in long term beneficial impacts.

A Moreton Bay Fig tree is located in vicinity of Chapala and Montecito Street. The tree was originally from Australia, transplanted as a seedling in 1877. This tree adds extremely high historical and aesthetic values for the citizens of the Santa Barbara, a City Landmark. This tree has been determined to be largest tree of its species in the United States (see discussion under the Cultural Resources Section). The Moreton Bay area is highly visible to tourists and residents who utilize this area for recreational purposes.

Proposed project construction would not have significant long-term impacts on the Moreton Bay Fig tree and visual resources located within this area. Installation of the box-culvert is a short-term activity, the culvert would be underground, and would not be visible from the surface. The culvert alignment would be far outside of the tree's dripline. Installation of culverts would result in short-term significant impact to the aesthetics of this area. Once construction is complete, the area around the fig tree would look the same as it does today. During the public meeting, people voiced their concern regarding the installation of culverts in the vicinity of the Fig Tree. The public believes this would be an adverse/significant impact to the landmark Morton Bay Fig Tree. However, as discussed in the Biological Resources Section, the placement of the culvert would not result in any significant impacts on this tree. A short-term

visual impact would be generated due to the construction activities, but conditions would be stabilized after installation of the culvert is completed and the project would not result in any adverse long-term impacts on visual resources in the vicinity of the Moreton Bay Fig tree.

During construction of the project, excavation of the creek, stabilization of the creek banks, stockpiling of excavated material and staging area for parking equipment, would have significant visual impacts to the neighborhood of the project area. The project area is located within a highly urbanized/residential and commercial zone of the City. The area between Mason Street and Cabrillo Boulevard is heavily utilized by tourists and residents to reach the beachfront area and Streams Wharf. Construction related impacts are significant but short-term; conditions will return to normal after construction is completed.

For safety reasons, some type of fencing would be installed along the banks. If chain-link type of fencing is used, there would be significant impacts on aesthetics.

Several bridges will need to be replaced as a result of all three alternatives. If standard modern bridge designs are used, they will alter the character of the surrounding neighborhood. While this is true for all of the bridges to be replaced, two bridges are of particular concern. The Chapala Street bridge, the design of which is unique in Santa Barbara, lends distinction to the immediate neighborhood. Its replacement with a modern bridge would result in a loss of visual character in the neighborhood. The Mason Street bridge is a small narrow bridge (narrower than the street on either side of it). The proposed bridge replacement would include part of Kimberley Avenue and would be substantially wider and more massive than the existing bridge. The replacement bridge would result in a significant aesthetic impact on the neighborhood.

Once construction is completed, the loss of existing large trees and vegetation would result in short-term impacts until the replaced vegetation reaches a larger size.

13.3.3 **Alternative 6 (Vegetated Stepped Walls)**:

Alternative 6 consists of removal of the existing creek banks and excavation of the creek bottom. This alternative includes installation of a culvert within the creek course, i.e excavation of the oxbow and installation of the culvert within the oxbow. Removal of the various types of existing banks and development of a natural bottom creek would improve the aesthetic and visual quality of that reach of the creek. The creek banks would be partially stabilized with vegetated stepped walls and vertical walls. The existing creek banks and bottom are partially covered with vegetation. Vegetation grows between, below, and above most of the private properties. No gallery of tree tops exists within the project boundary, although there are individual stately native trees at various locations along the creek. Similarly, no layer of shrubby native plants, normally found beneath a tree canopy in its natural setting, grow along this section of Mission Creek.

In addition, urban refuse is a very common sight throughout the project area. In comparison to the existing condition, the project would result in long term beneficial impacts.

Aesthetically/visually, the creek banks would be improved with the stabilization of banks. Vegetation would be planted along the stepped walls to provide a natural setting. However, the use of stepped walls would limit the size and scope of vegetation planted in the area due to the narrow planting areas between the upper and lower walls. The creek bottom would be natural; therefore, no degradation of aesthetics or visuals would occur. The project includes vertical walls in certain reaches; in these areas, aesthetic treatment could be provided to the banks to produce a natural setting, by planting vines. Bridge replacement impacts resulting from Alternative 6 would be similar to those in Alternative 12.

For safety reasons, some type of fencing would be installed along the banks. If chain-link type of fencing is used, there would be significant impacts on aesthetic resources.

This alternative includes installation of culverts within the creek course, i.e., within the oxbow area. These features would need excavation and stabilization of banks. Therefore, the meandering course of the creek would be slightly altered. The stepped walls would be vegetated to minimize project related impacts to the aesthetic resources.

This alternative would also have the same features of construction of habitat expansion zones as Alternative 12. Therefore, impacts related to the visual/aesthetic resources would be very similar to the Alternative 12. Implementation of these features will enhance degraded conditions of the creek. However, because of the limitations in providing vegetation of stepped walls, as discussed above, the benefits would not be as great as those provided by Alternative 12.

Short-term impacts related to the construction of the project are similar to Alternative 12.

13.3.4 **Alternative 8 (Vertical Walls)**:

The visual quality of the project area would be altered by excavation of the creek and construction of sideslopes. The creek bottom would be natural. During the public scoping meeting, there was strong opposition from the public to the use of vertical-concrete walls. Concrete walls would not look natural and would be more urban. Aesthetic treatments, such as colored concrete and/or the use of concrete forms to mimic the look of the existing sandstone walls or a natural vertical creek bank, would be incorporated into project plans to minimize project-related impacts or vines would be planted to cover vertical walls.

The post-project construction conditions would be an improvement to the existing conditions. Downstream of Canon Perdido Street, Mission Creek passes through a highly

urbanized section of the City of Santa Barbara. Existing banks have been stabilized by the property owners as observed during field visit. These banks have stabilized by using: stacked sand bags or concrete bags; dumped rocks with soil packed between them; sprayed concrete surfaces; grouted stone; jointed masonry walls; wooden pilings and sand stone walls. The slope of the creek varies from vertical to gentle throughout the project reach.

Like Alternative 12, this alternative also incorporates construction of habitat expansion zones as identified in impact analysis of the Alternative 12. Therefore, even with the vertical walls, some green parks would be observed along the banks of the creek. However, because this alternative does not include the oxbow bypass, the wetland in the oxbow area would not be constructed. In addition, it would be necessary to remove the existing sandstone wall in the Mission Creek Diversion between Montecito and Yanonali Streets. It is possible that this wall's replacement would result in a loss of its aesthetic qualities.

During construction of the project, excavation of the creek, stabilization of the creek banks, stockpiling of excavated material and staging area for parking equipment would have significant visual impacts to the neighborhood of the project area. The project area is located within a highly urbanized/residential and commercial zone of the City. The area between Mason Street and Cabrillo Boulevard is utilized by tourists and residents to reach the beachfront area and Stearns Wharf. Construction related impacts are significant but short-term; conditions will return to normal after construction is completed.

Bridge replacement and fencing impacts would be similar to those in Alternative 12.

13.3.5 **Future Maintenance**:

The proposed project would need future maintenance to maintain the capacity of the creek and provide needed flood protection to the City of Santa Barbara. In the past, Santa Barbara County maintained the creek course within the project reach at intervals of approximately every two years. About 2,400 cy of material would be required to be removed to maintain the constructed project capacity. Future maintenance would be very similar to past maintenance activities. The maintenance operation would take about 15 to 30 days. During future maintenance, material would not be stockpiled within the project area. These impacts would be very short-term and temporary. The impacts would be very similar to the past maintenance of the project reach and would not be considered to be significant. All environmental commitments identified would be followed to minimize short-term impacts.

13.3.6 **Mitigation Measures:**

- Aesthetic treatment, including the use of colored concrete and/or pouring concrete in forms that would mimic existing sandstone walls or natural vertical creek banks, shall be incorporated into project plans to minimize project-related impacts.
- Planting of vines shall be required along the creek banks to cover vertical walls.
- Bridges shall be designed to retain an appearance appropriate to the character of the neighborhood in which they are located.
- Vegetate stepped walls and create natural creek like environment (Alternative 6 only).
- Use color concrete and rough surfaces for vertical walls.
- Upgraded or improved fencing such as simple pipe and cable fencing shall be provided along the banks along with planting of vines over fencing.

Final project design shall be reviewed by representatives of the City of Santa Barbara Planning Commission and design boards to assure maximum consideration of aesthetics in the final design.

13.4 **RESIDUAL IMPACTS:**

If all mitigation measures are carried out as listed above, the long-term impacts of Alternatives 12 and 8 would be reduced to less than significant. Because of the use of vertical walls throughout the project reach in Alternative 6, visual resources/aesthetics impacts would remain significant and unavoidable. Short-term aesthetic impacts would be significant and unavoidable.

SECTION - 14 - RECREATION

14.1 EXISTING RESOURCES AVAILABLE FOR RECREATION:

Most of the area along Mission and Rattlesnake Creeks is heavily used for recreation. The creeks provide natural areas in an urban environment for such activities as hiking, picnicking, and birdwatching. Natural areas in the upper reaches of Mission Creek and Rattlesnake Creek are used more extensively than the urbanized section of Lower Mission Creek. Passive recreation use (such as hiking and birdwatching) of the lower reaches does occur, especially in the reach between State Street and Oak Park, and in other areas of the creek that are visually or physically accessible. The City has installed interpretive panels at Cabrillo Boulevard, State Street, and Mason Street Bridges, describing the estuary. Chase Palm Park is located on the beach side of Cabrillo Boulevard near the outlet of Mission Creek. Facilities include a soccer field and a craft center. The beach adjacent to the outlet is also heavily used. Beach-goers can access both sides of the creek, even during heavy flows when the creek continues all the way to the ocean, by using the street that crosses over the lagoon.

The Santa Barbara area has 37 developed parks, many with picnic equipment, some with facilities for lawn bowling, shuffleboard, volleyball or softball. Several have lighted tennis courts. Salt water fishing provides year-round sport for residents and visitors. Lake Cachuma, 24 miles northwest of Santa Barbara, offers good trout and bass fishing. However, the only neighborhood park and recreation space available for the area between U.S. Highway 101 and Canon Perdido Street is Mission Creek. There are no neighborhood parks in this area. As a result, even the limited recreational opportunities provided by the creek are highly valued by area residents.

14.2 CITY OF SANTA BARBARA POLICIES FOR PARKS AND RECREATION:

The Parks and Recreation Element of the General Plan focuses on the provision of adequate park space and recreation facilities for residents/visitors to the City. Regarding the Moreton Bay Fig Tree at Chapala and Montecito Streets, the Parks and Recreation Element refers to this area as a Special Use Area and states:

> *"The Moreton Bay Fig Tree is a major landmark in the City. The park area surrounding this unique specimen should ultimately be expanded to provide an appropriate setting and protection. The General Plan proposes that the crosstown freeway design provide an appropriate setting and protection. The*

General Plan proposes that the crosstown freeway provide for grade separations at State Street, but not at Chapala Street. It is recommended that Chapala Street be terminated at points above the freeway and below the railroad tracks so that additional land can be devoted to the park area around the Moreton Bay Fig Tree."

Open Space Element:

The primary purpose and goal of the Open Space Element is:

> *"to protect the character of Santa Barbara...by conserving and providing significant open and natural landforms through and around the community.*

The Open Space Element also states:

> *"There are many overlaps between open space and other community features which share the goal of conserving the Santa Barbara character. The protection of mature trees on private property, landscaping of major developments, policies on architectural sign control, and many other subjects in the General Plan serve a function parallel with that of open space. Only those segments of open space meeting the criteria of Citywide significance are discussed here."*

The Open Space Element discusses Creek issues as follows:

> *"The major drainage channels which pass through the City are San Roque, Arroyo Burro, Mission Canyon [sic], and Sycamore Creeks. These drainage channels should remain in their natural state, providing recreation facilities as proposed in the Parks and Recreation section as well as open space corridors through the community. It is recognized that certain maintenance, clearing, and alignment work may have to be done in order to minimize flood damage. However, all such flood control work should be done in a manner that will maintain the natural qualities of the creek open space. Further artificial channelization and/or lining, in any form, must not occur.*
>
> *"Implementation of the creek open space category involves the City's establishment of firm policies to preserve these channels in their natural state. These policies must be enforced by the City, the County Flood Control District, and the Army Corps of Engineers. The acquisition of rights-of-way for trails, while important to the recreation system, is not essential to the protection of these corridors for open space purposes. Special regulations for development adjacent*

to the major creeks should be enacted to prevent construction in creek open space areas and to protect development from known flood hazards. While much of the land adjacent to these creeks is already developed, most will be redeveloped. New construction should respect the creeks as important community open space."

14.3 IMPACTS ON RECREATIONAL RESOURCES:

The project related impacts are considered significant if project implementation would result in the loss of existing recreational areas or pursuits and loss of access to recreational areas. The project area is located within a densely populated area. Lower Mission Creek is a very important resource to the residents of Santa Barbara. Recreational activities like walking along the creek bank and bird watching are prominent within the project area. A small amount of parkland is available to residents within the project. There is no official park space in the project reach between Carrillo Street and U.S. Highway 101. Elimination of this resource is considered an adverse impact. The Moreton Bay Fig Tree at Chapala and Montecito Streets is a special use area and very important to the city of Santa Barbara, both for its historic and recreational aspects.

14.3.1 Alternative 1-No Action (Without Project Conditions).

The No Action Alternative would not alter existing recreational activities. Residents of Santa Barbara would continue to enjoy walking along the creek banks, where access is available, and bird watching activities.

14.3.2 Alternative 12:

This alternative involves construction of a natural bottom channel, and stabilizing the creek creek banks with a combination of vertical walls and vegetated riprap.

Because of width limitations along virtually all of the Lower Mission Creek Project, little beyond actual flood control oriented facilities could reasonably be incorporated within project rights-of-way (R/W). Project associated recreational amenities would probably be limited to the viewing of revegetated riparian habitat and aesthetic hardscape features incorporated as part of channel construction and the habitat expansion zones created where remnant parcels are left following project construction. These viewing areas could be located on the upper bank of the channel, taking the form of pocket or strip parks, could be situated on street bridges overlooking the creek bed or could simply consist of seating areas placed along the channel where space and the need exists. Other, non-flood related proposed project facilities, such as the constructed wetlands/riparian development on Caltrans property between Highway 101 and Gutierrez Street, because of limited size, would also be best viewed from outside of project R/W's.

Currently, no gallery of tree tops exist within the project boundary, although there are individual stately, native trees at various locations along the creek. Compared to the existing conditions, the project would result in long term beneficial impacts. Compared to any other alternatives, this alternative will provide maximum coverage of natural vegetation within the project area. The proposed alternative incorporates planting native and riparian type of vegetation on the upper slopes, construction of about six habitat expansion zones. These parcels range in size between 0.03 and 0.52 acres (Fig. 3.5.4). If these open land parcels are available, each would be designed to expand the corridor of riparian habitat to be planted along the stream banks. Native trees, primarily western sycamores, cottonwoods, and coast live oak, from local nursery stock would be planted into the habitat expansion zones. In time, their canopies would form dense clusters on the overbank and adjacent to stream corridor. Planting along the riprap, and planting of native trees in habitat expansion zones are integral part of the project design. The construction of the proposed wetland would provide additional ecological and recreational benefits. However, construction of this wetland is subject to cleanup of the existing known contamination (see details in Section 15, HTRW of the DEIS/EIR). If, prior to the completion of project construction, the designated site is remediated, then the wetland would be constructed as planned.

Native riparian vegetation planting along the creeks banks, within the habitat expansion zones, would increase bird population. These zones would be along the creeks, and would expand opportunities to watch nature, and activities like bird watching while walking along the creek. In addition, seating areas could be provided within these small habitat expansion zones or be built into the replaced bridges, which could facilitate morning or evening walks and resting areas along the creek. Recreational activities such as bird watching, walking along the creek, viewing of revegetated riparian habitat would be provided by implementation of this alternative. After completion of the project, more recreational activities would be available to public compared to the existing conditions.

Installation of the oxbow bypass culvert, partially in an open space, near the Fig Tree, between Gutierrez Street and Yanonali Street, would result in short-term impacts on recreational activities. Straightening of the channel and installation of culverts would run under the park area. Once the culvert is completed, it would be covered and the surface returned to its existing condition. Implementation of this alternative would not result in long-term adverse impact to the recreational resources.

During construction, recreational activities would be interrupted for a short time frame. However, creek flows through the urban area do not provide continuous nature walk type activities within this project reach. After construction of the project, there would be an increase in recreational type of activities within the project reach as described above.

14.3.3 **Alternatives 6**:

Alternative6 consists of removal of existing creek banks and excavation of the creek bottom. This alternative includes installation of an oxbow bypass culvert, stabilization of creek banks with stepped walls, expansion of habitat zones and construction of wetland. The environmental impacts would be very similar to Alternative 12. Stepped walls would be vegetated to create a somewhat natural appearance. Therefore, residents would enjoy a newly constructed creek compared to the existing creek environment. Habitat expansion zones would be created along the creek banks where real estate is available, similar to Alternative 12. These habitat zones would attract birds, and people will enjoy bird watching activities and other passive recreation. Therefore, there would be no recreational impacts.

Project related short-term impacts would be same as Alternative 12.

14.3.4 **Alternative 8 (Vertical Walls)**:

Alternative 8 consists of a natural bottom, stabilization of the creek banks with vertical walls, and limited habitat expansion zones. Implementation of Alternative 8 would alter the visual quality of the creek, which is directly related to recreational activities like walking along the creek banks and enjoying the natural environment. A small amount of neighborhood parkland and open land are available to residents in this area. During the public scoping meeting, there was strong opposition from the public for vertical concrete walls, because they would alter the creek into a concrete channel and the creek would lose its natural characteristics. However, existing conditions do not provide completely natural features, the banks have been stabilized with different types of material and the visual quality of the creek has been degraded by deposition of refuse in the creek bed. With the implementation of these alternatives, the creek bottom would be natural but the sideslopes would be vertical walls, which would have adverse impacts on recreational activities like walking and bird watching due to the loss of vegetation. However, habitat expansion zones would provide some opportunity for recreational activities. Because, with vertical walls, it would not be possible to plant significant vegetation and the already limited recreational opportunities would be lost, recreation impacts from vertical wall alternatives would be significant and unavoidable.

14.3.5 **Future Maintenance**:

The proposed project would need future maintenance to maintain the capacity of the creek and provide needed flood protection to the City of Santa Barbara. In the past, Santa Barbara County maintained the creek course within the project reach at interval of approximately every two years. Similar types of activities or maintenance would be performed in the future to maintain the capacity of the creek. The maintenance operation would last about 15 to 30 days

and would occur about every year. These impacts are very short-term and temporary and would be adverse, but not significant.

14.4 Mitigation Measures:

- Plant native riparian vegetation which would allow increased opportunity for bird watching and provide maximum access to the residents for recreation use.

- Small pocket parks shall be created where real estate is available.

- Seating and viewing areas shall be designed into replaced budges. Final project design shall be reviewed by the representatives of the City of Santa Barbra Planning and Parks and Recreation Commissions and design review boards to assure consideration of recreational opportunities in the final design.

14.5 RESIDUAL IMPACTS

With the inclusion of the above-stated mitigation measures, recreation impacts caused by Alternatives 12 and 6 would be reduced to less than significant. However, as stated above, construction of Alternative 8 would result in significant unavoidable recreation impacts.

SECTION - 15 - HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

15.1 EXISTING CONDITIONS:

Approach and Methodology:

A dual-faceted approach was utilized to characterize existing conditions regarding potential contamination of water and/or sediments within the reach of Lower Mission Creek from Canon Perdido Street to Cabrillo Boulevard (Figure 15-1). This approach consisted of (1) identifying historical evidence or indications of possible direct or indirect Hazardous, Toxic and Radioactive Waste (HTRW) contamination of the subject reach, and then (2) obtaining empirical evidence of current status through a site reconnaissance and obtaining water and sediment samples for subsequent laboratory analysis. Results of the laboratory analysis of the water and sediment samples are discussed in Section 7, Water Resources.

- Records and archives of the Presidio Museum and the Santa Barbara Historical Society were reviewed for information pertaining to historical land uses adjacent to and near the subject reach.

- Interviews were conducted with Santa Barbara County and City staff to identify prior land uses with the potential to impact the subject reach.

- A consulting firm searched appropriate regulatory data bases for records of HTRW contamination.

- Aerial photos obtained from the Santa Barbara County Flood Control District were examined for evidence of prior land uses of the area.

- Michael Redman of the Santa Barbara Historical Society was interviewed to locate historical maps of the area.

- A telephone interview was conducted with Brian Trautwein of the Environmental Defense Center to identify any concerns of that organization and to obtain additional contacts for subsequent interviews.

- A meeting was held with Karl Treiberg, Engineer, Santa Barbara County Flood Control District, to discuss storm water runoff and water quality issues relating to Lower Mission Creek.

- Other historical information regarding storm water and water quality within Lower Mission Creek was obtained through conversations with Mike Higgins and Richard Aleshire of the Central Coast Regional Water Quality Control Board, Dan Reid, Supervisor of the Santa Barbara County Department of Health and Human Services, Richard Evans with the Santa Barbara County Protection Services Department, and Pat Kelly, City Engineer for the City of Santa Barbara.

- Other individuals interviewed regarding the subject area included a drilling contractor and a hazardous waste cleanup specialist with experience in the immediate vicinity.

15.1.2 **Results**

Land Use

Research indicates that the existing channel between Canon Perdido Street and Cabrillo Boulevard has been in essentially the same alignment since 1850. A minor modification of the alignment occurred south of West Gutierrez Street associated with the realignment of Highway 101. Land uses within the existing alignment corridor have increased in density as compared to the early history of the area and the areas characterized below as commercial land uses were at one time mostly residential.

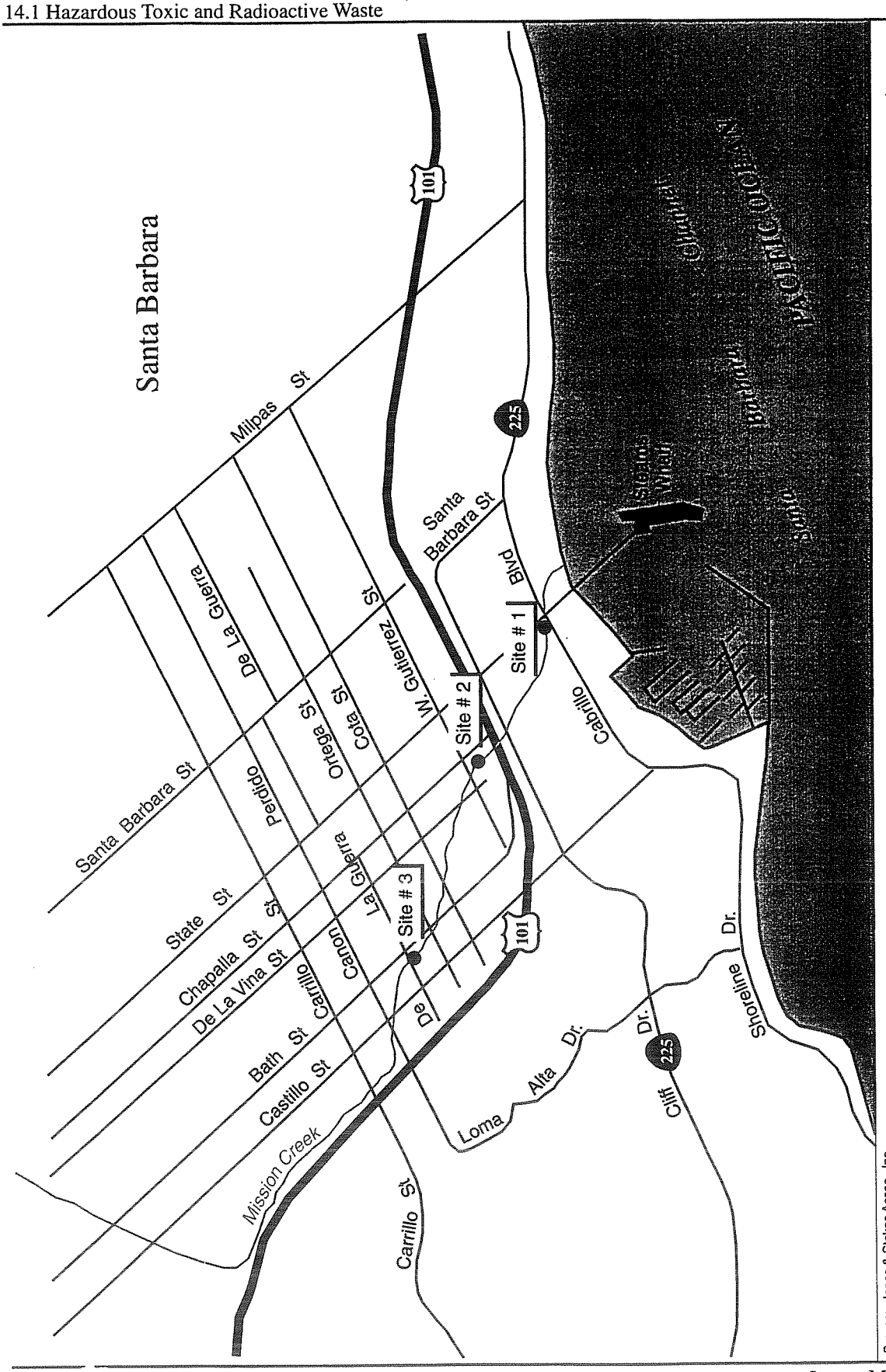
Current land use is mixed single family and multi-family residential between Canon Perdido and West Gutierrez Street with the exception of the church at Canon Perdido and Bath Street and a hardware store on De la Vina Street just north of Haley Street. Apartment complexes occur, but are the exception in this stream reach.

Commencing at West Gutierrez Street, commercial land uses dominate the eastern stream bank. Several automotive repair establishments exist nearby and along Chapala Street. Professional offices occupy the southwest bank at the West Gutierrez Street Bridge. The adjacent vacant lot facing De la Vina Street and adjoining the west creek bank is fenced and posted with hazardous waste caution signs indicating CALTRANS ownership. This location is discussed in greater detail below with the results of the HTRW record search.

Commencing south of the U.S. Highway 101 bridge, the west bank is occupied with a mixture of single and multi-family residential units. The west bank land use changes to commercial for the two lots facing Cabrillo Boulevard and adjoining Lower Mission Creek in the vicinity of the State Street Bridge. The east bank near Highway 101 is adjacent to a parking lot and railway station. Further downstream, commercial land uses are predominant with the eastern bank at the State Street Bridge being adjacent to a parking lot.

15.1.3 **HTRW Record Search**

A hazardous records search was conducted to identify the locations of known contaminated sites within one half mile of the centerline of the subject reach. The results of the effort are summarized in Table 15-1 and shown in Figure 15-1 below. The inventory was accomplished by conducting a comprehensive data base search of the following federal and state data bases:



Vicinity Map
Figure 15-1

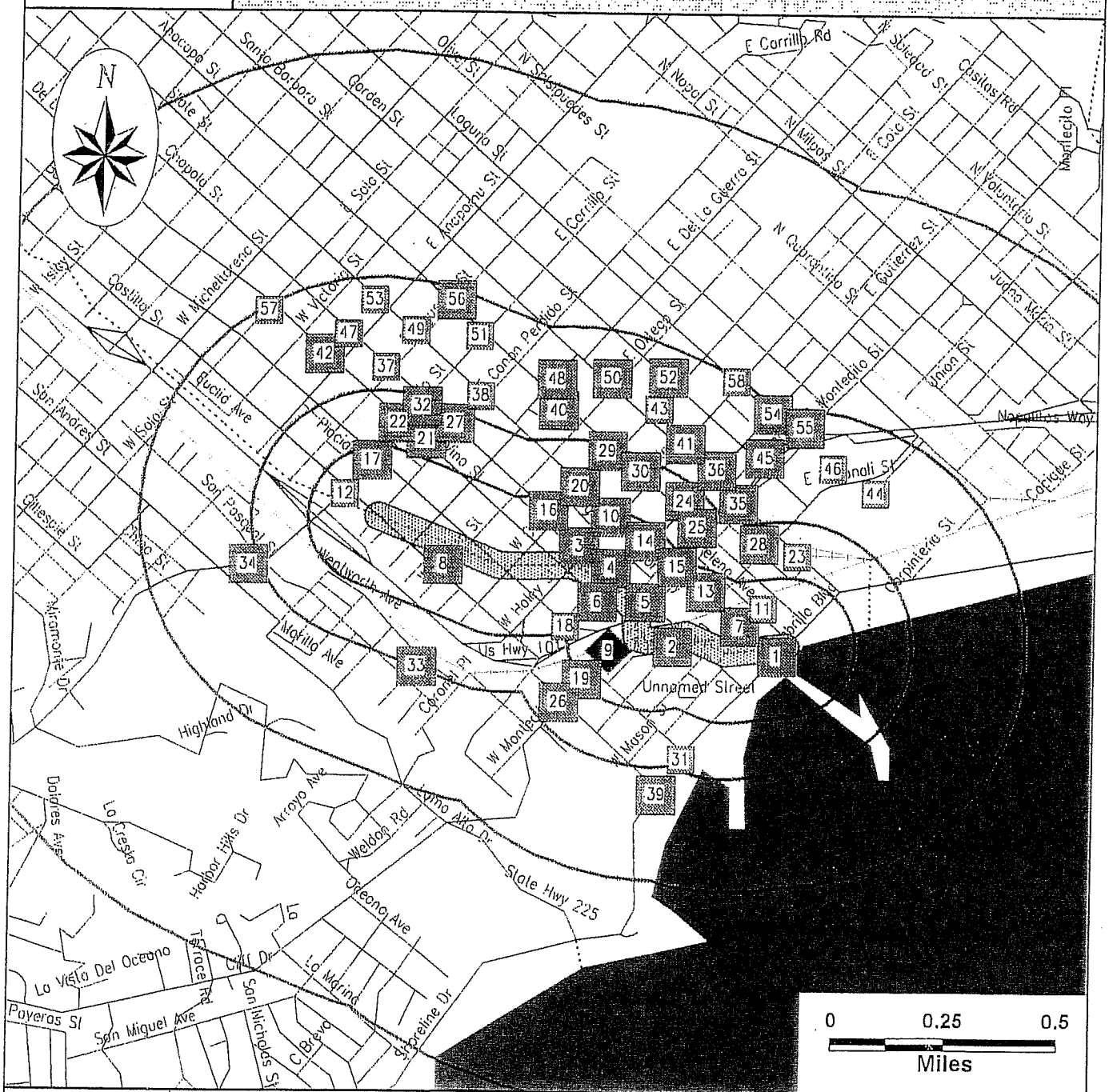
Lower Mission Creek
9878.1 Lower Mission Creek/Figures\wFig 1 vicinity map

Table 15-1 Site Distribution Summary Agency/Database/Type of Records			W/in 1/8 mile	W/in 1/8 to 1/4 mile	W/in 1/4 to ½ mile	W/in ½ to 1 mile
A) Databases searched to 1 Mile						
US EPA	NPL	National Priority List	0	0	0	0
US EPA	CORRACTS	RCRA corrective actions	1	0	0	0
STATE	SPL	State equivalent priority list	0	0	0	0
B) Databases searched to 1/2 Mile						
US EPA	RCRA-TSD	RCRA permitted treatment, storage, disposal facilities	0	0	0	-
STATE	SCL	State equivalent CERCLIS list	2	0	2	-
US EPA	CERCLIS/ NFRAP	Sites under review by US EPA	1	0	1	-
STATE/ REG/CO	LUST	Leaking underground storage tanks	40	22	28	-
STATE/ REG/CO	SWLF	Solid waste landfills, incinerators, or transfer stations	0	0	0	-
STATE	NON ASTM	Additional federal, state, and regional lists	45	25	40	-
US EPA	TRIS	Toxic relaease inventory database	0	0	0	-
C) Databases searched to 1/4 Mile						
STATE/CO	UST	Registered underground storage tanks	9	9	-	-
STATE	AST	Registered aboveground storage tanks	0	0	-	-
D) Databases searched to 1/8 Mile						
US EPA	GNRTR	RCRA registered small or large generators of hazardous waste	18	-	-	-
US EPA	RCRS Viol	RCRA violations/ enforcement actions	1	-	-	-
US EPA/ STATE	SPILLS	ERNS and state spills lists	6	-	-	-

Source: Vista Information Services

SITE ASSESSMENT - SPECIAL REPORT

Detail Map



Subject Centerline	Category:	A	B	C	D	Risk Sites Plotted as Polygons
Search Area	Single Sites					
	Multiple Sites					

Highways and Major Roads
Roads
Railroads
Rivers or Water Bodies
Utilities

Categories correspond to database searches described in the Site Distribution Summary, beginning on Page #1.

Figure 15-2

- EPA's comprehensive environmental response, compensation and liability information system (CERCLIS)/No further remedial action required (NFRAP); Resource Conservation and Recovery Act (RCRA) corrective sites (CORRACTS); RCRA registered small or large generators of hazardous wastes (GNRTR); National Priority List (NPL); RCRA permitted treatment, storage, disposal facilities (RCRA-TSD); RCRA violations /enforcement actions (RCRA Viol); Emergency response notification system (ERNS) and state spills lists (SPILLS); and Toxic release and inventory system (TRIS).

- State of California's registered aboveground storage tanks (AST); Leaking Underground fuel tanks (LUFT) lists; State equivalent comprehensive environmental response compensation and liability information system (CERCLIS) list (SCL); State equivalent priority list (SPL); Solid waste landfills, incinerators, or transfer stations (SWLF); and Registered underground storage tanks (UST).

- Additional federal, state and regional lists (NON ASTM); NPL sites, a.k.a. "Superfund Sites" are known hazardous sites requiring immediate cleanup. CORRACTS sites are RCRA facilities undergoing corrective action. SPL and SCL sites are sites with state involvement in cleanup activities at known locations and sites where no further cleanup is required, respectively. CERCLIS/NFRAP sites have been removed from CERCLIS after initial investigation found either no contamination, contamination was quickly removed, or the contamination was not considered serious enough to warrant Federal Superfund action or NPL consideration. LUFT sites are sites with subsurface hazardous material contamination resulting from underground tank leaks. SWLF sites are solid waste landfills, incinerators, or transfer stations. NONASTM sites are locations identified for various reasons on additional federal, state, or regional lists. TRIS locations are facilities which manufacture, process or import toxic chemicals in quantities sufficient to trigger federal reporting requirements. UST's are simply registered underground tanks (the designation carries no connotation of contamination as does a LUFT). AST's are simply registered aboveground tanks (the designation carries no connotation of contamination or particular environmental problems). GNRTR sites are facilities that generate hazardous or toxic waste streams as an integral part of their economic activities. RCRS Viol are locations involved in RCRA violations and/or enforcement actions. SPILLS sites are locations with reported spills reported under various legislation.

Table 15-1 identifies 1 CORRACTS site, 0 SPL sites, 4 SCL sites, 2 CERCLIS/NFRAP site, 90 LUFT sites, 0 SWLF sites, 110 Non ASTM sites, 0 TRIS sites, 18 UST's, 0 AST sites, 18 GNRTR locations, 1 RCRS Viol site, and 6 SPILLS sites within ½ mile of the centerline of the subject reach of the creek.

The records indicate that there were previously a rather large number of reportable phenomena such as small spills of waste oil and leaking underground fuel tanks and that, in some cases, potable ground water was affected. 40 LUFTs were reported as previously occurring within ⅛ mile of the centerline of the subject stream reach (note: the methodology employed by the data base search firm double-counted sites with joint Cal EPA and CCRWQCB involvement). Considering the concentration of commercial and automotive establishments historically and currently located in the vicinity of the lower part of the subject area, a large number of past occurrences is not unexpected. Analyzing the implications of this information is

not a straightforward exercise. Although records indicate that, for many of the sites, remediation was completed and the case files are closed, it should be noted that, for others, records in the data base kept by the Central Coast Regional Water Quality Control Board (CCRWQCB) may not accurately reflect the most current remediation status of a given site. Initial conversations with regulatory agency staff and careful review of the results of the data base search results (Table 15.1-1) and accompanying maps of identified locations (Figure 15-2), indicated that, with two significant exceptions, no obvious evidence of existing serious contamination from sites occurring within ⅛ - ½ mile of the alignment corridor was apparent.

Subsequent recent follow-up investigations with Cal EPA, Santa Barbara County, and the Central Coast Regional Water Quality Control Board (CCRWQCB) indicate that remediation activities are still ongoing for several sites. General consensus among those agency's staffs is that significant levels of hydrocarbon contamination in the shallow groundwater does not appear to be a major problem at this time. To put this in perspective, it should be noted that even though the shallow groundwater is known to be polluted and considered to be non potable, the Basin Plan considers the shallow aquifer as being capable of supporting beneficial use. Therefore, criteria pollutants are not supposed to exceed Maximum Contaminant Levels (MCLs) as discussed in Section 7, Water Resources. Minimum cleanup levels for contamination events are set at the relevant MCL. Unless valid overriding concerns exist, the CCRWQCB requires that these levels be achieved prior to approving site closure. For purposes of the proposed project excavation activities, additional information as to current status of these sites and the affected media is very important. Follow up contact has been made with Santa Barbara County and the CCRWQCB. Current information regarding status of these LUFT sites is included in Table 15-2.

The two exceptions mentioned above are considered serious existing situations by the CCRWQCB. These involve properties at 324 De la Vina Street and at 220 West Gutierrez Street. The De la Vina property abuts Lower Mission Creek just below the West Gutierrez Street bridge. This property is known to be contaminated with perchlorethylene (PCE), a solvent used in the dry cleaning of fabrics. Conversations with the CCRWQCB staff revealed that this property was once the site of a dry cleaning establishment and that Caltrans came into title of the site via a land acquisition associated with the widening of Highway 101. The PCE contamination affects the soil and shallow groundwater at the De la Vina site. Cleanup of the site has been delayed partly due to legal proceedings involving the site of a former dry cleaning chemical wholesale establishment at 220 West Gutierrez Street (approximately ½ block northwest of the De la Vina site).

220 West Gutierrez Street formerly had a large above-ground tank in which PCE was stored for sale to the dry cleaning industry. This tank is reported by the CCRWQCB to have leaked over a period of several years, resulting in severe contamination of the shallow groundwater aquifer in the area. The contaminant plume is reported to be migrating southeast toward the Caltrans site. The attorneys representing the property owner at 220 West Gutierrez Street are reportedly attempting to involve Caltrans in sharing in the cost of remediation of the PCE plume. Apparently this litigation (or threat of litigation) has influenced the delay in remediation of the De la Vina Street site. (Pers Comm. Richard Aleshire CCRWQCB)

Visual inspection of the stream corridor revealed no obvious outward physical signs of substantial contamination within the subject alignment. This observation is part of the investigation process but obviously provides little or no information regarding subsurface and/or groundwater contamination. Due to the number of former LUFTs in the vicinity of the lower project reach, it would seem prudent to identify infrastructure and buildings that are slated for removal near these identified sites as part of the proposed project and characterize the soils at these locations. Table 15-2 provides street addresses and regulatory status for the LUFT sites in closest proximity to the project area. When considering this information it is helpful to know the following:

- The 500 block of Chapala Street is between Haley and Cota Streets
- The 400 block of Chapala Street is between Haley and Gutierrez Streets
- The 300 block of Chapala Street is between Gutierrez Street and the freeway
- The 200 block of Chapala Street is south of the freeway
- The 100 block of State Street is between Yanonali and Mason Streets

Conversations with Santa Barbara County Flood Control Department Hydrologist, John Alroth and CCRWQCB Engineer Richard Aleshire indicate that the regional gradient for the shallow groundwater in the area runs generally toward the ocean and toward incising creeks. Bearing this in mind and reviewing the project engineering alternatives maps, a number of potentially problematic locations are apparent. These include:

- The area from Haley Street downstream
- The Haley Street bridge, the two buildings slated for removal near the creek
- Both sides of the creek south of West Gutierrez Street
- The area from Mason Street downstream
- The Mason Street bridge, the two buildings slated for removal near the creek

15.2 CITY OF SANTA BARBARA PLANS AND POLICIES FOR WATER AND MARINE ENVIRONMENTS (WHICH COULD BE APPLICABLE TO HTRW):

Policy 6.9 in the Water and Marine Environments Section of the City of Santa Barbara Local Coastal Plan and Policies applies to HTRW considerations for this project. This policy states:

- *The City shall support the programs, plans and policies of all government agencies, including those of the Regional Water Quality Control Board with respect to best management practices for Santa Barbara's watersheds and urban areas.*

Consistent with this policy, the County and City of Santa Barbara are contemplating submitting a joint Storm Water Pollution Prevention Plan (SWPP) to the CCRWQCB to satisfy requirements of the National Pollution Discharge Elimination System (NPDES).

15.3 IMPACT ANALYSIS OF HTRW

15.3.1 Alternative 1: No Action

Under the No Action Alternative, there would be no project-related change in the baseline conditions found in the water and sediment sampling efforts discussed above. To the degree that the City and County of Santa Barbara are successful in developing and implementing Best Management Practices (BMPs) for reduction of storm water-related pollution of Lower Mission Creek, concentrations of contaminants could be expected to decrease over time.

15.3.2 Alternatives 12, 6 and 8:

Under project construction Alternatives 12, 6 and 8, foreseeable potential impacts would be related to construction activities. These would include:

- Possible need to dispose of contaminated soils encountered during excavation activities;
- Possible water contamination by excavation of streets and buildings where existing soil contamination is unidentified;
- Possible release of hydrocarbon contaminated groundwater encountered in excavation activities downgradient of Haley Street;
- Possible water contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants;
- Sediment contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants;
- Possibility of encountering PCE-contaminated soils and/or shallow groundwater in the vicinity of the West Gutierrez Street Bridge. This event could potentially cause releases of this substance to the environment; and,
- Possibility of encountering deep sediment contaminated by HTRW. Although analysis of shallow sediments did not identify concentrations of target analytes above regulatory action thresholds, there is an unknown degree of probability that excavation activities could encounter previously undetected contamination at deeper levels.

15.3.3 Future Maintenance:

To retain the capacity of the creek, sediment removal would be required in the future. During such sediment removal/maintenance, all the environmental commitments identified in Section 15.4 would be followed to avoid contamination within the project area. Future maintenance would not have any significant impacts to environment.

Table 15-2

Recorded Leaking Underground Storage Tanks Proximate to Lower Mission Creek

Map ID No.	Facility ID No.	Site Description/Location	Substance	Affected Media	Remediation Status
1	211	Santa Barbara Nissan 36 State Street	Gasoline	Other Ground Water	Post Remedial Monitoring
2	2093	Former 7-Up Bottling Plant 203 Chapala Street	Gasoline	Undefined	Case Closed
3	318	Courtesy Motors 527 Chapala Street	Gasoline	Municipal Aquifer	Undergoing Remediation
3	718	Firestone Tire 506 Chapala Street	Lube Oil	Undefined	Case Closed
4	270	Hughie's Auto 401 Chapala Street	Gasoline	Soil Only	Case Closed
4	2489	Hiete Property 414 Chapala Street	Gasoline	Undefined	Undergoing Remediation
6	5	Cal Trans 324 De la Vina Street	PCE	Shallow Groundwater	Legal Action Only
6	2506	403 De la Vina Street	Waste Oil	Undefined	Tank Closed Workplan Requested '94
7	2295	101 State Street	Diesel	Undefined	In Site Assessment Phase
7	304	Chess Motors Inc. 118 State Street	Waste Oil	Shallow Groundwater	Tank Closed Classified as Low Risk Site
8	2	Paseo Nuevo Mall 651 Paseo Nuevo	PCE	Shallow Groundwater	Case Closed
9	2907	240 Montecito West 240 West Montecito Street	Gasoline	Shallow Groundwater	Case Closed

15.4 MITIGATION OF POTENTIAL HTRW IMPACTS:

- Impact: Possible need to dispose of contaminated soils encountered during excavation activities

  Mitigation: Prior to construction, borings and soil samples shall be taken at potentially critical areas and analyzed at a qualified laboratory for likely contaminants. If concentrations are detected at or above action levels, state what these action levels are or which agency's criteria will be used. Remediation action shall be implemented in accordance with federal, state, and county procedures.

- Impact: Possible water contamination by excavation of streets and buildings where existing soil contamination is unidentified.

  Mitigation: Prior to construction, borings and soil samples shall be taken at potentially critical areas and analyzed at a qualified laboratory for likely contaminants. If concentrations are detected at or above action levels, remediation action shall be implemented in accordance with federal, state, and county procedures.

- Impact: Possibility of releasing hydrocarbon-contaminated groundwater in shallow aquifer downgradient of Haley Street.

  Mitigation: Prior to commencement of excavation activities on the downstream side of the Haley Street Bridge, the Corps shall develop a shallow groundwater water and soil sampling plan designed to detect the presence of petroleum hydrocarbons. The recommended sampling plan shall be implemented prior to commencement of excavation activities. If elevated levels of petroleum hydrocarbons are detected, the CCRWQCB and County Department of Health and Human Services shall be consulted to help assess the situation and an appropriate regulatory response shall be developed and implemented to remediate the contamination.

- Impact: Possibility of water contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants.

  Mitigation: Equipment shall be kept in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work. The Corps shall develop and implement a spill prevention and remediation plan and workers shall be instructed as to its requirements. Construction supervisors and workers shall be instructed to be alert for indications of equipment-related contamination such as stains and odors. Construction supervisors and workers shall be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan if indications of equipment-related contamination are noted. Construction equipment shall only be operated within dewatered areas of the creek.

- Impact: Possibility of sediment contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants.

  Mitigation: Equipment shall be kept in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work. The Corps shall develop and implement a spill prevention and remediation plan and workers shall be instructed as to its requirements. Construction supervisors and workers shall be instructed to be alert for indications of equipment-related contamination such as stains and odors. Construction supervisors and workers shall be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan if indications of equipment-related contamination are noted.

- Impact: Possibility of encountering PCE contaminated soil and/or shallow groundwater in the vicinity of the West Gutierrez Street Bridge. This event could potentially cause releases of this substance to the environment.

Mitigation: Prior to commencement of excavation activities on the downstream side of the West Gutierrez Street Bridge, the Corps shall develop a shallow groundwater water and soil sampling plan designed to detect the presence of PCE and/or toxic byproducts of PCE degradation. The recommended sampling plan shall be implemented prior to commencement of excavation activities. If PCE or hazardous or toxic byproducts of PCE degradation are detected, the CCRWQCB and County Department of Health Services shall be consulted to help assess the situation and an appropriate regulatory response will be developed and implemented to remediate the contamination.

- Impact: Possibility of encountering deep sediment contaminated by HTRW. Although analysis of shallow sediments did not identify alarming concentrations of target analytes, there is an unknown degree of possibility that excavation activities could encounter previously undetected contamination at deeper levels.

  Mitigation: When the Corps is prepared to commence excavation activities, samples of creek sediments shall be taken to the depth of the planned excavation and the same suite of analyses used to characterize the shallow sediments will be used to analyze the deep sediments. In the event actionable concentrations of contaminants are detected by the analyses, the Corps shall develop a plan to characterize the extent of contamination. A plan shall then be developed and implemented to comply with applicable laws and regulations related to the identified contamination so that excavation activities do not result in releases of HTRW to the environment.

15.5 RESIDUAL IMPACTS:

With the implementation of the above-stated mitigation measures, HTRW impacts would be reduced to less than significance.

SECTION - 16 - TRAFFIC

16.1 EXISTING TRAFFIC CONDITIONS:

Traffic volume data has been obtained for the primary transportation routes within the study area, including Highway 101 and local surface streets. Data has also been obtained regarding local railway traffic. Traffic routes pertinent to the proposed action and traffic related safety concerns are discussed briefly in the following paragraphs.

16.1.2 Highway Circulation and Access

U.S. Highway 101 passes through the City of Santa Barbara, and is the main north/south access route for those traveling from Southern California to the San Francisco Bay area. The highway runs mostly parallel to the ocean, passing through many of California's well-known landmarks. Highway 101 provides the City of Santa Barbara with access to many other parts of California and the United States. Three on/off ramps on Highway 101 are located within the project area at Bath, Carrillo and Castillo Streets.

The State of California, Department of Transportation (Caltrans), surveys traffic volumes for many locations along the California state highway system. According to Caltrans data for 1997, the average daily traffic count on Highway 101 through the project area ranges from 103,000 at Castillo Street to 119,000 at Carrillo Street (both directions). Table 16.1-1 below summarizes traffic volumes on Highway 101 on/off ramps located within the project area.

TABLE 16.1-1
DAILY TRAFFIC VOLUMES -1997
ROUTE 101 ON/OFF RAMPS

STREET NAME	NORTHBOUND		SOUTHBOUND	
	On	Off	On	Off
Bath	8,800	2,500	2,800	6,900
Castillo	9,000	3,500	3,400	7,000
Carrillo	13,800	6,600	7,500	14,600

16.1.3 Local Access and Traffic Circulation

The proposed project is located within a densely populated area. The project area is dissected by a number of local streets. Traffic volume estimates for each street were obtained from a traffic map (1996), provided by the City of Santa Barbara. Tables 16.1-2 and 16.1-3 display average daily traffic volumes for streets crossing the creek.

As discussed earlier in this report, the main land use in the project area are residential, commercial and recreational. In addition, many of the streets in the area provide routes for people traveling to, from, and between downtown Santa Barbara and the waterfront. Therefore, traffic volumes are generally high along the local streets passing through the project area. Parking along local streets is limited and time limits and restrictions are imposed by the City of Santa Barbara to regulate parking.

Table 16.1-2 depicts traffic volumes along the local streets crossing the creek from northwest to southeast. Most of the streets have two way traffic, but a few are one way. The general range of traffic volume within the project area is about 1,700 to 6,500 vehicles per day. This volume represents local surface traffic. However, some streets carry heavier traffic compared to others. These streets are Carrillo and Haley Streets and Cabrillo Boulevard. According to traffic data provided by the City of Santa Barbara, about 32,600 vehicles per day travel along Carrillo Street. The high volume of traffic on this street is due to Highway 101 on/off ramps located at this street intersection. Cabrillo Boulevard and Haley Street also experience high volumes of traffic. The average daily traffic count for these streets is about 23,000 to 15,100 vehicles. Both streets also provide access to Highway 101. In addition, many retail businesses are located along these streets.

TABLE 16.1-2
DAILY TRAFFIC VOLUMES FOR STREET SEGMENTS-1996
(NORTHWEST TO SOUTHEAST DIRECTED STREETS)

STREET	TYPE STREET	# OF LANES	DAILY TRAFFIC VOLUME
Carrillo	Principal Arterial Street (Public)	2	31,900 to 32,600
Canon Perdido	Local Street (Public)	2	1,700 to 3,300
De la Guerra	Local Street (Public)	2	2,100 to 3,100
Ortega	Local Street (Public)	2	2,900 to 5,300
Cota	Local Street (Public)	2	2,800 to 3,500
Haley*	Principal Arterial Street (Public)	2	10,100 to 15,100
Gutierrez*	Principal Arterial Street (Public)	2	3,700 to 8,200
Montecito	Street (Public)	2	4,200 to 7,900
Yanonali	Local Street (Public)	2	5,800 to 5,600
Mason	Local Street (Public)	2	N/A
Cabrillo Blvd.	Local Street (Public)	2	21,300 to 23,000

***These two streets form a one-way couplet.**

Table 16.1-3 depicts traffic volumes along the local streets with a southwest to northeast direction. The average traffic count for these streets ranges from 2,600 to 15,000 vehicles. State Street varies between a tow and four lane street in both directions. It provides access to retail businesses and city landmarks. During the site visit, heavy traffic volumes were observed along state street. The peak traffic count for State Street is about 15,000 vehicles per day.

TABLE 16.1-3
DAILY TRAFFIC VOLUMES FOR STREET SEGMENTS
(SOUTHWEST TO NORTHEAST DIRECTED STREETS)

STREET	TYPE OF STREET	# OF LANES	DAILY TRAFFIC VOLUME
Castillo*	Local Street (public)	2	4,000 to 5,200
Bath*	Local Street (public)	2	4,200 to 5,200
De la Vina**	Local Street (public)	2	2,600 to 4,900
Chapala	Local Street (public)	2	2,000 to 3,400
State	Local Street (public)	2-4	9,100 o 15,000

* These two streets form a one-way couplet.
** De la Vina Street is a one-way street, south-bound, to Haley Street.

16.1.2 Railway Circulation & Access

In 1996, Union Pacific Railroad acquired Southern Pacific Railroad. This enabled Union Pacific to establish an "I-5 Corridor" along the West Coast that offers the most efficient possible north-south transportation service to freight customers and Amtrak passengers in all three Pacific Coast states. This service travels through the City of Santa Barbara and the study area of Lower Mission Creek. The majority of Union Pacific freight trains travel between the San Francisco Bay Area and the Los Angeles Basin. The rail traffic volume varies widely, since the Coast Line is not Union Pacific's primary route through California. Depending on conditions on the San Joaquin Valley route and such factors as weather, as few as 2-3 freight trains per day, or as many as 10-12 travel through the study area.

Passenger service provided by Amtrak trains also runs on Union Pacific tracks. Depending on the day and time of year, between 1,000-1,750 Amtrak passengers travel through Santa Barbara per day. Eight San Diegan (four round-trip trains from Los Angeles/San Diego to Santa Barbara with one round-trip continuing to San Luis Obispo) and two Coast Starlight trains (one to Los Angeles and one to Seattle) travel through Santa Barbara each day. Additional service is provided between Los Angeles and San Luis Obispo by scheduled connecting Amtrak Motor coach service.

16.2 IMPACT ANALYSIS:

Impacts would be considered adverse and significant if trucks removing debris from the site were to use streets other than designated truck routes; if project-related traffic were to increase substantially through residential and commercial areas; if construction-related traffic were to limit access/through traffic in areas adjacent to the creek for substantial periods of time; if project-related traffic or road closures substantially increase traffic delay; if project-related traffic were to occur during hours other than those stipulated in local ordinances (4 a.m. to 7 p.m. weekdays and Saturday); or if construction traffic contributed to traffic at already impacted intersections (Level of Service C. 22.0 second delay during p.m. peak hour (4 p.m. to 6 p.m).

16.2.1 Alternative 1- No Action (Without Project Conditions):

The County of Santa Barbara has maintained the project reach area in the past to provide flood protection to the City of Santa Barbara. During past maintenance, excavated material was loaded directly into dump trucks and transported to disposal or construction sites. The designated truck route was used to transport the material. Material was distributed within a radius a of 10 miles from the project site. The maintenance operation occurred for about 10 to 15 days. Traffic-related impacts were short-term and not significant.

16.2.2 Alternatives 12, 6 and 8:

The proposed project construction would affect the operation of roadways in the immediate vicinity of the project site. The alternatives would result in an increase of traffic on surface streets as well as on Highway 101.

During project construction, an increase in traffic and delays would occur on the selected haul routes. Hauling of materials and equipment to and from the project site would primarily use Highway 101 and the three nearby on/off ramps. Carrillo Street on/off ramp is located near the upstream end of the project, while Castillo Street on/off ramp is near the lower end and provides the most direct route to the proposed staging and stockpiling sites. Access and haul routes from the staging and stockpiling sites to the specific creek construction site would use roads that are nearest to the creek, while taking the most direct route. Above Highway 101, it is expected that De la Vina, Castillo, and Bath Streets would generally be the main haul routes from the staging area, while Castillo, Montecito, Yanonali, Mason, and State Streets would provide the main access during construction downstream of Highway 101. Selected haul routes will be coordinated with the City of Santa Barbara.

A maximum of about 25 truck trips per day would be required to transport excavated material from the creek bed to the staging area or disposal sites. There would be 20 to 30 construction workers, resulting in 20-30 daily vehicle trips. A maximum of 30 to 35 truck trips per day would be required to transport construction related material. Total maximum truck numbers would about 65 to 75 truck trips per day. Section 16.1 identifies the number of vehicles

traveling along the local streets, and on/off ramp traffic (Tables 16.1-1, 16.1-2 and 16.1-3). Compared to this volume of traffic, the increase in number of truck trips is negligible. Construction-related activities and increased truck traffic due to transportation of construction material, hauling excavated material and commute of workers will potentially cause emergency response time to increase slightly. Also, some residents may not have direct access to their residences. Street closure would be required in some locations. These impacts are short-term and adverse, but not significant. Particular concerns would arise during the replacement of the De la Vina/ Haley Street bridge which would impact a major commuter route on Haley Street.

Without project conditions in past flooding in the Lower Mission Creek Floodplain/ Laguna Channel Drainage Area impeded automobiles and railroad traffic within the City of Santa Barbara. Automobile traffic within the City of Santa Barbara is expected to be severely impacted when flooding events occur in the Lower Mission Creek Floodplain and Laguna Channel Drainage Area. It was necessary to detour traffic to alternate routes when the streets were flooded. Railroad traffic was also disrupted due to flooding. Amtrak operates passenger trains on the railroad tracks running through the two drainage areas. The train station, which is located within the Lower Mission Creek floodplain, is used by Amtrak to load and unload passengers. About 1,000 to 1,750 passengers travel through Santa Barbara per day. Without implementation of the proposed project construction, the City of Santa Barbara would continue to experience disruption in traffic during severe flooding. In addition, clean-up costs for the streets and railroads were about $ 3.5 million (see details in Economic Analysis Appendix). The project purpose is to provide flood protection and safety to the residents by reducing damage to the surface streets, Highway 101 and railroads. Implementation of the project would reduce the cleanup costs within the Floodplain of Lower Mission Creek.

16.2.3 **Future Maintenance**:

Future maintenance would be required to maintain the creek capacity. Future maintenance would be similar to the past maintenance of the Lower Mission Creek within the project reach. Removal of material would take about 15 to 30 days and would take about 10 to 15 truck trips per day. Impacts related to the future maintenance would be similar to the present maintenance activities performed by the Santa Barbara County Flood Control District. Future Maintenance related impacts would be short term; traffic generated from the maintenance activities would not be significant.

16.3 **Mitigation Measures**:

- Provide traffic controller at each intersection where construction is performed.
- Provide detour signs for alternate routes.
- Limit number of vehicles, size of vehicles, reduce speed limits.
- Perform project construction in sections.
- Provide alternative bicycle route.

- Identify location, time and duration of construction of each segment, bridge and installation of culverts.
- Notify residents and commercial owners of proposed construction in their area at least 15 days before initiation of construction in the vicinity of their neighborhood.
- Identify damage caused by construction vehicles and repair costs.
- Identify responsible agency or individuals to repair the damaged roads and assure that repair work is completed.

16.4 RESIDUAL IMPACTS:

Implementation of the above mitigation measures will further reduce adverse, but not significant traffic impacts.

SECTION - 17 - SAFETY

17.1 EXISTING CONDITIONS:

The potential for flooding along the Lower Mission Creek is considered life threatening. Every winter season the city faces the threat of flooding in a large urbanized area in Santa Barbara. The long-term hazard relates to existing conditions on the creek that can generate not only significant water flows but also significant sediment and debris flows, which could in turn cause flooding along the creek with associated property damage and potential for loss of life (for details on flooding history refer to main report Section II). During the site visit it was observed that residential and commercial dwellings are located at the bank, few houses do not have any buffer zone, even the walls of the buildings were constructed along the banks. These properties face a flood threat during heavy rains or a storm event. Traffic related safety has been described in Section 15.0 of this document.

17.2 CITY OF SANTA BARBARA PLANS AND POLICIES FOR SAFETY/ FLOODING POLICIES:

1. Establish and enforce adequate creek setbacks or buffer zones to protect new development from flood and erosion hazards.

2. Conduct "precise-alignment" studies along Mission and Arroyo Burro Creeks to determine the most efficient stream channel configuration and setback distances. Any improvements resulting from the studies should be reviewed as to consistency with the Conservation Element.

3. To assure the effectiveness and structural integrity of flood containment structures placed on private land, all such construction shall be subject to the approval of the Santa Barbara County Flood Control District.

4. Encourage light intensity use in the floodway or floodway fringe with the requirement that such uses shall not impair the flood-carrying capacity of the stream.

The City has established setbacks along Mission Creek which require that new development be placed a minimum of twenty-five feet away from creek banks; however, much of the property along Mission Creek was developed long before the setbacks were established. In addition, within the flood zones, the City requires that new development be constructed such that finished floor elevations are above projected flood levels. All new construction is also subject to review and approval by the Santa Barbara County Flood Control District.

17.3 IMPACT ANALYSIS:

Impacts would be considered significant if the alternatives did not reduce the threat of continued flooding and potential loss of life and property that could result from major floods of the Lower Mission Creek. Impacts would also be considered significant if channel design and to consider the safety of individuals.

17.3.1 Alternative 1- No Action (Without Project Conditions):

The City of Santa Barbara would have continuous threat of flooding. To provide flood protection. Properties would be at danger at every flood event.

17.3.2 Alternatives 12 and 8:

These alternatives consist of excavation of the creek banks and bottom, stabilizing banks partially with vegetated stepped walls and vertical walls, with oxbow bypass. Installation of culverts would occur outside of the creek course passing through the open space in the vicinity of the Fig Tree, between Gutierrez Street to Yanoanali Streets. In addition, people may get into by-pass tunnel. During public scoping meeting residents of Santa Barbara expressed their concern regarding safety, they stated that criminals would live and hide in culvert.

17.3.3 Alternative 6:

During construction, there would be an increase in truck traffic and that may cause accidents. These impacts would be short-term and with implementation of mitigation it would be insignificant. After completion of the project, it could be possible that people entering within the creek bed can be injured. Project implementation would result in long term beneficial impacts by providing flood protection to the City of Santa Barbara.

17.3.4 Mitigation Measures:

- Short-term Impacts: During construction, Traffic control officers would be provided to divert traffic to minimize accidents.
- Long-term Impacts: Fencing or other type of the protection shall be provided for ~~the~~ public safety. Access points shall be provided to facilitate safe rescue.
- Installation of fencing along the banks.

SECTION - 18 - CULTURAL RESOURCES

18.1 EXISTING CULTURAL RESOURCES:

18.1.1 Cultural History and Chronology:

The Santa Barbara area has been occupied by humans for approximately 9,000 years. There has been an enduring Native American presence which continues to have a very strong interest in their past and the preservation of their culture. The combination of a mild year round Mediterranean climate, abundant resources, and low coastal valley terrain have induced the proliferation of culture from Paleoindian to the diverse present day populations.

Cultural history is generally divided into temporal divisions based on evolving economic, social, and political events which in turn may reflect shifting environmental conditions. These temporal divisions are rooted in the observed material culture and settlement patterns. Since David B. Rogers (Rogers 1929) proposed the initial chronological scheme for the Chumash on the Santa Barbara Mainland, approximately six other researchers have introduced their own systems, each feeling the previous systems failed to adequately address cultural change. Currently, three systems are routinely used for the Santa Barbara area (Table 18.1).

Jon Erlandson (1994) addresses various chronological systems, but hones in on a system that is an amalgam of two earlier systems. His preferred chronology is the one that is frequently used by Santa Barbara area archaeologists. In his book, the commercial publication of his doctoral dissertation, Erlandson discusses the following periods: Paleoindian Horizon, Oak Grove or Millingstone Horizon, the Hunting People or Intermediate Horizon, Late Prehistoric Cultures, and lastly, the Ethnohistoric Chumash.

The Paleoindian Tradition:

Presently the Paleoindian Tradition in the Santa Barbara area of Coastal California is very speculative. Precisely when the Paleoindian Tradition began is unknown, but we have concluding dates that occur somewhere around 9000 years Before Present (B. P.). This particular horizon is more widely known in the southern part of the State as the San Dieguito Tradition. With two minor exceptions, this horizon is not well expressed in the Central Coastal part of the state. So far, only two fluted point fragments have been found: one on Mendocino Point, and the other on a coastal plain west of Santa Barbara (Erlandson 1994:44).

Table 18.1 Concordance of Chronologies Used in the Santa Barbara Region

C^{14} Years	Rogers 1929	Wallace 1955	Warren 1968	King 1981	Calendar Years	Geological Time Scale
	Historic Chumash	Historic Cultures	Historic Cultures	Late Period *Phase 3*		
					AD 1782 (168 BP)	
				Late Period *Phase 2*		
			Late	AD 1500	AD 1670 (280 BP)	
		Horizon IV	Period	Late Period *Phase 1*		
				AD 1150	AD 1380 (570 BP)	
AD 1000	Canaliño	*Late Prehistoric*	(Yuman/ Shoshonean)	Middle Period *Phase 5*		Late
				AD 900	AD 1170 (780 BP)	Holocene
			(Chumash)	Middle Period *Phase 4*		
				AD 700	AD 980 (970 BP)	
			San Diego	Middle Period *Phase 3*		
				AD 300	AD 580 (1370 BP)	
AD 0	?	?		Middle Period *Phase 2*		
				800 BC	800 BC (2750 BP)	
	Hunting People	Horizon III *Intermediate*	Campbell Tradition	Middle Period *Phase 1*		
				1400 BC	1490 BC (3440 BP)	3350 BP
				Early Period *Phase Z*		
				2400 BC	2850 BC (4800 BP)	Middle Holocene
3000 BC	hiatus?		?	Early Period *Phase Y*		
			Encinitas Tradition	4500 BC	5250 BC (7200 BP)	6650 RYBP
	Oak Grove	Horizon II *Millingstone*		Early Period *Phase X*		Early Holocene
			?		6630 BC (8580 BP)	
				6000 BC ?		
8000 BC			San Dieguito Tradition		8600 BC (10,550 BP)	10,000 BP
	?	Horizon I *Early Man*		?		Terminal Pleistocene

Source: Erlandson and Colton 1991

The Oak Grove or Millingstone Horizon:

Spanning an extended 4,000 year period of cultural stability is the horizon originally dubbed "Oak Grove" by Rogers (1929). He termed the extant culture "Oak Grove People." Lasting from 9000 until 5000 B.P., this cultural period has also been combined with the Millingstone Horizon as identified later by William Wallace (1955) and the Encinitas Tradition described by Claude Warren (Warren 1968). Clearly, the significance behind the name "Millingstone" refers to the consistent appearance of large grinding stones, specifically manos and metates, that were assumed to be used for processing small seeds.

Indeed, the classic traits of the Millingstone horizon revolve around a subsistence economy, relying heavily on seeds and shellfish (Erlandson 1994). The period was aptly summarized by Wallace (1978), who determined that the period was characterized by the appearance of heavy, deep-basined metates and one-handed manos referred to as handstones, rare projectile points associated with the atlatl and dart, crude core and flake tools, polished stone disks, and cogstones.

In the Santa Barbara area, archaeological sites from this period are usually found inland from the modern coast on elevated land forms such as knolls or terraces (Glassow et al. 1988). Rogers' excavations showed that the larger sites all had extensive midden deposits, pit houses, and cemeteries. Many researchers feel that the Millingstone people were a sedentary culture. Others have speculated that the sites reflect multiple occupation episodes by nomadic groups over extended periods of time (Owen 1964). Glassow et al. (1988) reasoned that the known Millingstone sites are residential base camps while the smaller sites are either undiscovered or unrecognized. Following review of the concept of cultural horizon versus cultural tradition, Colten (1991:88) reiterated Warren's (1968) theory that the cultural elements of the Millingstone horizon more properly define a tradition rather than a horizon.

The Hunting People or Intermediate Horizon:

Dates for the coastal region for this period range approximately from 2,500 to 5,500 years B.P. The Hunting People term was coined by Rogers (1929) and the Intermediate Horizon was formulated by Wallace (1955). Generally speaking, this time frame represents "progressive shifts" (Erlandson 1994:47) in many southern and central California locations. Approximately 5,500 years ago, mortars and pestles were becoming prevalent over the earlier Millingstone food processing equipment. This change is attributed to an increasing reliance on acorns in the diet. More varied hunting practices were emphasized during this period. There were technological changes seen in the transition from the earlier crude projectile points to large side-notched and contracting stem points.

A marked increase in the abundance and variety of vegetal material, land and sea mammal remains, and fish shows greater diversity in the prehistoric diet. The inhabitants were selecting fish that had previously been avoided which in turn may have dictated new fishing technologies. Considerable varieties of nearshore fish were caught using compound bone fishhooks, gorges, J-shaped shell fishhooks, and net weights (Macko 1985). New fishing equipment showed that fish were being caught with nets and hook-and-line technology. The observed changes reflect the expansion of available food resources and the expenditure of greater amounts of energy. King (1981) proposed that this was in response to meeting the necessary dietary requirements of an increasing population. However, the importance of shellfish declined during this period, perhaps due to over exploitation.

Archaeological sites associated with this period are frequently major settlements with residential features and cemeteries, and were probably inhabited year-round. They are found occupying a variety of habitats in the Santa Barbara area. Smaller settlements were assumed to be used seasonally while specialized sites, such as processing camps, are fairly typical.

Late Prehistoric or Late Period:

During the Late Prehistoric Period, which Erlandson puts between 2,500 years ago and A.D. 1882, individual cultures flourished and achieved the distinguishing characteristics which they still bear today. Populations increased, with widely dispersed settlements occupying a diverse array of inland and coastal localities. The material culture of the various tribes in central and southern California was similar even though there was substantial cultural variation. This undoubtedly developed through various types of intertribal interaction. The Chumash population around the Santa Barbara Channel had by far the highest hunter-gatherer population in what is now Southern California. High population and cultural complexity were trademarks of Chumash culture (Erlandson 1994:48).

By the time Europeans made their appearance in the Santa Barbara area, the Chumash had coastal villages with populations of up to 1,000 residents, social and political hierarchies with marked status differentiation, craft specialization, and extensive trade networks with the Channel Islands and greater Southwest. Exploitation of the marine environment became a focus of Chumash culture.

Chumash prosperity was reflected in their material culture. Excavated sites have produced an abundance of very well made artifacts. Soapstone vessels such as stone bowls were traded from Catalina Island, along with shell and bone fishhooks, shell beads, charmstones, pendants, and other utilitarian and ceremonial items (Erlandson 1994). The bow and arrow became the predominant hunting weapon during the middle of the first millennium A. D. In addition to stone, shell, and bone implements, wood also had its uses. The most notable use of wood was for the plank canoe they called the tomol.

18.1.2 **Ethnohistoric and Ethnographic Chumash:**

Chumash, the local name for Santa Cruz Island and its inhabitants, was applied to all of the Indians by John Wesley Powell in 1891 (Grant 1978a). Prior to Powell's naming convention, others referred to them simply as the Santa Barbara Indians. Each local population had its own name. Chumash of the Santa Barbara area, known as Barbareño, called themselves Wal-wa-ren-na.

Assigning Chumash to the correct language phylum has been problematic. Over the years, there has been difficulty in determining if Chumash was a Hokan variant or an isolated stock. In 1954, Swanton (1984:484) said that Chumash was originally thought to be a "distinct linguistic stock" but it was then redefined in the larger Hokan family. Until the early 1990s, Chumash have been considered Hokan speakers with each geographic division having its own distinct language or dialect. However, there is a current movement to rethink the linguistic roots of the Chumash language (Marianne Mithun 1990:320). Apparently, the solution to the problem has come full circle. There is now substantial reason to once again consider the Chumash language group a linguistic isolate that was erroneously assigned to the Hokan phylum by A. L. Kroeber, Edward Sapir (John Johnson, personal communication 1997), and John Swanton (1984).

At the time of European contact, the coastal Chumash were involved in extensive trading. The trade networks probably served to help redistribute wealth and act as a political and economic link with other Chumash populations and other tribes. The Spanish noted the Chumash propensity for hard work, and trading and bartering. Individual Chumash also had ample opportunity to engage in economic specialization. Internecine warfare was frequent among Chumash villages. Reasons for warfare included raiding other villages for stored food during periods of shortages and territorial disputes over resource rights (Erlandson 1994:50).

The Barbareño Chumash lived along the coastal plain from Point Conception to Punta Gorda in Ventura County (Grant 1978b). Much of our knowledge of the ethnohistoric Chumash comes from the journals of the early Spanish explorers. From their accounts, we know that the Chumash were a communal culture who lived in round permanent houses that were arranged in groups. Some houses were up to 50 feet in diameter and held as many as 70 people. Their sleeping arrangements were such that they slept on beds with partitions between them affording them some level of privacy. They had whale vertebra stools and thatched their houses with tule, carrizo grass, wild alfalfa, and fern. Subterranean sweathouses with roof openings were prominent features in the villages.

A typical Chumash village, like the ones near the area of potential effects (APE), would have been found on high ground above river and stream channels where the water ran into the ocean, or bordering a slough as in Goleta. Villages were comprised of several houses, storage locations, ceremonial enclosures, a sweathouse, and cemeteries. The one near the APE for the present study was syuxtun, also known as Burton Mound, near Cabrillo Boulevard.

There are presently Barbareño Chumash who still have hereditary links to syuxtun. An estimate of the current Chumash population is about 5,000 with around one- third of them being Barbareño (Gilbert Unzueta, personal communication 1997).

18.1.3 **History**:

Portuguese explorer Juan Cabrillo claimed the Santa Barbara area for Spain in 1542. It was a full 60 years before another Spanish explorer, Sebastian Vizcaino, would land in the area. Vizcaino's three ships entered the Santa Barbara harbor to escape a particularly violent storm in 1602. In honor of safely reaching ground, a Carmelite Friar named the Channel and nearby shore Santa Barbara. They named the area after Saint Barbara in thanks to God for answering their prayers for safe passage through the storm. That day, December 4, 1602, was the commemorative feast day for Saint Barbara.

The historical period began in Santa Barbara when the Spanish arrived in 1782 to set up a military presidio, followed by a mission. The Spanish who founded the City of Santa Barbara included Father Junipero Serra, Captain Jose Ortega, and Governor Felipe de Neve. Yanonali Street, in the study area, is named after Chief Yanonali who welcomed the Spanish and assisted them in getting situated in Santa Barbara. Yanonali was the chief of the village of syuxtun, which was located on the waterfront. Missionization of Santa Barbara with its attendant push to have all neophytes live at the mission by 1803 contributed to the demise of syuxtun and other villages in the Mission Creek area. Missionization was also a major influence in the high mortality rates of Chumash converts. Spanish domination lasted until 1822, when Santa Barbara became Mexican territory.

Santa Barbara came under the control of the United States in 1846, when John C. Fremont overthrew the Mexican army. By then Santa Barbara had become a cultural mix. The cultural influences included Chumash, Spanish, Mexican, and Anglo-American. In some instances, the language became a patois of mixed language elements.

Cattle ranching became an important aspect of the Santa Barbara economy in the mid-1800s. The shipping industry was very strong with the regular arrival of ships from the east coast to export local cattle hides. In the 1850s, Santa Barbara experienced its first crime wave. Unsuccessful, lawless prospectors came south from the northern California gold fields bringing illegal activities with them.

The transition from a cattle ranching community to a metropolitan center began with the advent of agriculture. When the cattle industry foundered in the 1860s, farmers bought up the ranch land at bargain prices. The fertile soils spawned an entire agricultural industry based on lemons, avocados, strawberries, and orchids. The agricultural industry still plays an important role in the Santa Barbara area economy. Throughout the 1800s, Santa Barbara existed within its own limited sphere until its natural beauty was discovered by wealthy easterners. Santa Barbara's State Street was the longest continuous strip of pavement on the west coast in 1888. To this day, the impact of the "discovery" of Santa Barbara continues with development of large

shopping centers and beach front hotels.

Santa Barbara really began to peak in the early 1900s. This period in Santa Barbara history focused on the advent of major institutions and attractions. The State Normal School of Manual Arts and Home Economics was established in 1909 and later became the University of California, Santa Barbara in 1954. Other major institutions that were conceived during this period were the Santa Barbara Museum of Natural History, the Santa Barbara Botanic Gardens, and the Andree Clark Bird Refuge.

The moving picture industry discovered Santa Barbara and it became the world's film capital in the late nineteenth century. Twelve hundred or so movies were made in Santa Barbara by the now defunct film maker, Flying A Studio. The studio at the corner of State and Mission Streets was the largest one in the world for upwards of ten years.

In following years, Santa Barbara was home to numerous film stars. Douglas Fairbanks, Mary Pickford, and Ronald Coleman all lived in Santa Barbara. Other film stars, such as Charlie Chaplin and Fess Parker, liked the area well enough to open their own hotels. Together, these various people have in turn hosted important film stars for social visits and weddings.

The Chumash still have a voice in local affairs. Even with a diminished population, the Chumash are a presence in local planning policy and strive to keep the world informed of their rich cultural heritage.

18.1.4 **Architectural History:**

An earthquake in 1925 gave the City the impetus to move away from its Victorian era architectural roots and stress Spanish, Mediterranean, and Southern California architectural styles instead. The main goal of the decision to favor those building styles, promoted by civic leader Pearl Chase, was to emulate architecture from areas with similar climatic conditions. The City also decided to limit building height to preserve the integrity of the city's low skyline. After the eight story Granada Building was constructed in 1922-24, the City restricted the height of commercial buildings to six stories and three stories for residences. Later, in order to insure that these architectural provisions would be met over the long-term, a general plan was developed. The plan, written for the City by Eisner-Stewart and Associates in the early 1960s, contained explicit language that guaranteed that the "city's unique Hispanic image" was to be maintained. These elements have contributed greatly to defining the inimitable atmosphere of the City today (Conrad and Nelson 1986).

After this architectural mandate, local building design in the Mission Creek area was a mix of Mission, Colonial Revival, Spanish Colonial Revival, Craftsman, Vernacular, modified

classicism, and various architectural mixes. Table 18.2 lists properties near the APE that help define the context of the built environment for the proposed project. The properties on the list have not been formally evaluated under Section 106 of the National Historic Preservation Act, but have requisite characteristics which render them potentially eligible. This initial assessment was done in the 1985 Cultural Resources Technical Synthesis Report (Macko) and expanded upon by later analysis as discussed below.

The historic neighborhood closest to the study area is the El Pueblo Viejo Landmark District. Mission Creek cuts through the southern portion of the District on about Yanonali Street heading southeasterly and encompassing Cabrillo Boulevard. It is interesting to note that, although the city approved the General Plan in 1964, the architectural requirements of the El Pueblo Viejo District require that distinctly late 18th and early 19th century styles reflect the City's Hispanic tradition. Part II, Section 22.22.104 of the Santa Barbara Municipal Code gives guidelines to insure historical compatibility with the extant architectural environment. The city's preference is toward "California Adobe" and "Monterrey Revival." The City also favors structures that are built in the "Spanish Colonial Revival style" that was popular between 1915 and 1930.

Table 18.2. Historic Buildings Previously Identified in the Lower Mission Creek Study Area

Building name	Address	Architectural Style	Year Built	Potentially National Register Eligible
Hotel Californian	35 State Street	Spanish Colonial revival	1925	Yes
Gledhill Studios	114 Chapala Street	eclectic with Mission Revival and Craftsman elements	1907	Yes
Apartment Building	118 Chapala Street	Modified Classic	1911	Yes
Kenney House	803 Bath Street	two-story Craftsman	1906	Yes
Leatherman House	116-118 Bath Street	Victorian cottage with Colonial Revival and Queen Anne details	1903	Yes

Another historic district, the Brinkerhoff Avenue Landmark District (BALD), is potentially affected by the project at the juncture of the northeast corner De la Vina and Haley Streets, north of Haley between De la Vina and Chapala Streets. The BALD neighborhood is comprised of late 19th and early 20th century styles emphasizing "Italianate", "Eastlake", "Colonial Revival", and "Queen Anne" designs. Part II, Section 22.22.114, Paragraph A. of the Santa Barbara Municipal Code (Santa Barbara 1995:30) requires that any new construction be compatible with this architectural tradition. These requirements greatly reflect the mixed architectural heritage of the study area and will provide a context for any potential future historical studies.

18.1.5 **Records and Literature Search:**

A search of existing information for the Lower Mission Creek project was initiated with a records and literature search from the Central Coastal Information Center (CCIC) at the University of California, Santa Barbara (Georganna Hawley, personal communication September 4, 1997: letter to Corps of Engineers staff archeologist, Richard M. Perry). Additional telephone consultation with City Supervising Civil Engineer, Doug Pike; Project Planner, Jan Hubbell; and Associate Planner/Urban Historian, Christine Savage Palmer, was conducted. Significance information on the eight affected bridges in the APE was taken from Caltrans' Historic Bridge Inventory (Caltrans 1986) dated March 1986. The cultural resources survey report (Macko 1985) that was prepared for an earlier version of the project was consulted, and historical information on the historic Californian Hotel Garage, and a brief city history were provided by Ms. Palmer (1997). The National Register of Historic Places (Internet Web site http://www.cr.nps.gov/nr/nrhome.html) was consulted and only a contributing element to a listed property is in the APE. The Mission Creek Diversion, discussed in more detail below, is a contributing element to the Santa Barbara Railroad Station, a National Register property.

The records search from the CCIC revealed eight archeological sites and fifty-one archeological surveys recorded within an expanded area. The APE was expanded for review purposes to provide a better perspective of the area's potential sensitivity for cultural resources. Three archaeological sites appeared to be very close to the APE. While not in the APE for the proposed project, they are close enough to Mission Creek to warrant concern for potential unknown buried site components.

A prehistoric archaeological site, CA-SBA-1958, the Twin Palms/Depot Park site, is very close to, but outside the APE. SBA-1958 was recorded in 1985 by Mike Macko for the earlier study of this project. It was recorded as a "low density chipped stone scatter and even lower density shell scatter." The other two sites, CA-SBA-27 and SBA-28, which are also very close by, were originally recorded in 1923 by D. B. Rogers. Both sites were originally interpreted as villages by Rogers. Rogers' excavations of SBA-27 uncovered a habitation site with midden debris, house circles, and 11 burials. Other burials were found later at this site by Lauren Santoro as part of an analysis related to the proposed expansion of a hotel in the area. The site was recorded west of Mission Creek near Cabrillo Boulevard. The third site, SBA-28, is also close to Mission Creek and SBA-27. Known previously as Burton Mound, the site was the former Chumash village of syuxtun. It was described earlier by Kroeber who knew it as Alpincha. Rogers excavated more than 300 burials and may have shipped as much as two tons of artifacts back to the Museum of Natural History in New York. Apparently due to the depth and complexity of the site, Rogers ascribed its occupation occurring, quite expansively, between 3,000 and 225 years ago.

Bridges in the Study Area:

In the mid-1980s, Caltrans embarked on an ambitious project whereby all Caltrans bridges in the State were inventoried and evaluated for their significance as historic properties under Section 106 of the National Historic Preservation Act. The inventory was organized by county within Caltrans's various districts. District 5's inventory was approved by the State Historic Preservation Officer (SHPO) in September 1986. Bridges were categorized with values between one and five. A category five value means that the bridges were excluded from further Section 106 consideration and thus are not eligible for NRHP listing. All of the bridges that are included in the project area fall within Category five. Caltrans is planning to update the now aging bridge inventory. However, according to Caltans Architectural Historian, Gloria Scott, they will not reevaluate category 5 bridges that were already 50 or more years old at the time of the original inventory (personal communication 1999). The bridges with their corresponding inventory numbers are included in Table. 18.3.

Table 18.3. Affected Bridges - Inland to the Ocean

Bridge Name	Bridge No.	Significance Cat.	Year Built
De la Guerra Street	51C0301	5	1912
Ortega Street	51C0300	5	1915
Cota Street	51C0246	5	1926
De la Vina at Haley	51C0247	5	1915
Gutierrez Street	51C0132	5	1926
Chapala Street	51C0250	5	1920
Mason Street	51C0287	5	? (1960s deck rehab.
Cabrillo Blvd.	51C0134	5	1940s or 50s

Source: Caltrans 1986

It is worth noting that, at the time of the historical inventory, all of the bridges except Mason Street and Cabrillo Boulevard had exceeded the 50-year-old base requirement for Section 106 eligibility. However, according to City of Santa Barbara Supervising Civil Engineer, Doug Pike (personal communication 1997), the Chapala Street Bridge is the only riveted steel pony truss bridge in the city and has considerable local historical interest. The bridge located on Chapala Street at Yanonali Street was built in 1920 and is 24.5 m long by 19.7 wide. Mr. Pike said that it is seismically deficient and may need to be removed. City Associate Planner/Urban Historian Christine Palmer (personal communication 1997) reiterated the local interest and probable historical value of the Chapala Bridge and said that it is in its original unmodified configuration. Macko (1985:123) considered the bridge to be potentially eligible for listing in the National Register and wrote that the bridge was added to the Historic American Engineering Record Inventory in 1978.

Additional points of local historical interest are the Moreton Bay Fig Free near the Amtrak station, the original Californian Hotel Garage constructed in 1925 at 15 West Mason Street, the Potter Hotel footbridge, and the Mission Creek Diversion on the creek's bank near Chapala Street. According to Ms. Palmer, the Moreton Bay Fig Tree is a Designated City Landmark and is on the National and State Lists of Big Trees. The Californian Hotel Garage was listed as a City of Santa Barbara "Structure of Merit" on January 27, 1988, and is so emblazoned with a designatory plaque on its western façade. The listing was done at the request of the building's then owners, Mr. And Mrs. Donald F. Williams. The date of the Potter Hotel footbridge is not known, but it is one of two existing man-made structures associated with the Potter Hotel. It is of questionable integrity, having lost four of its original lampposts. The footbridge was used as a shortcut for hotel porters to walk over Mission Creek to the train station. The Mission Creek Diversion wall had not been recorded at the time of the 1997 study.

18.1.6 **Present Study Results**:

18.1.6.1 Structures Determined to be Eligible for Listing on the National Register of Historic Places

A narrowly defined APE was resurveyed in September 1997 by two Corps of Engineers staff archaeologists. The survey design was based on the results of the records and literature search and previous surveys. Also included in the survey were the locations of three proposed staging areas. Based on the 1997 study, two properties were determined to merit consideration as historic properties; the Chapala Street Bridge, and the Californian Hotel Garage, as discussed below. Otherwise, the APE was negative for cultural resources.

It was determined by the 1997 study that the building that originally housed the Californian Hotel Garage (15 West Mason Street) had very good integrity and was currently being used. It was listed as a one-story brick and stucco building, industrial in form, when it was recorded on the 1978 City of Santa Barbara, Architectural and Historic Resources Survey form. Its historical value lies in its response to the perceived needs of the motoring public and its role as an early automobile service facility. Now, the southern half is home to a fitness center and the northern half is available for rent. The westerly wall is part of the embankment for Mission Creek and, as a result, the entire building is imperiled by proposed channel improvement efforts. The California Office of Historic Preservation has determined that this structure is not eligible for inclusion on the National Register of Historic Places.

The Chapala Street Bridge also has very good structural and historical integrity. It has remained unmodified with the exception of an asphalt coating on the decking, which may or may not be original. The bridge is still being used for everyday traffic.

The Moreton Bay Fig tree was determined to be extremely close to the APE, located in the area dubbed as the "Oxbow." In addition to being listed as the biggest tree of its type in the country, it is also considered valuable and significant as part of the environmental and cultural history of Santa Barbara. It was brought from Australia in 1874 and originally planted near State and Montecito Streets. The Crabb family, who lived on the corner of Chapala and Montecito Streets, transplanted it in 1877 in its present location.

Since the Corps survey was conducted in 1997, the APE has been expanded to allow for the possibility of a 3,400 cfs channel with a maximum top width of 70-feet across. The City of Santa Barbara contracted an updated architectural resources survey of the APE for this project. The updated historic building survey entitled "Phase I/II Architectural Resources Report for The Mission Creek Flood Control Project (ARR)" prepared by Post/Hazeltine Associates (PHA), identified nine cultural resources in two neighborhoods in the APE that meet the criteria for inclusion in the National Register of Historic Places. The newly identified properties that meet National Register criteria in the Waterfront and Westside Neighborhoods that could be adversely affected by the proposed project are as follows:

Pony Truss Bridge at Chapala and Yanonali Streets - built in 1920. The bridge is eighty-four feet long by sixty-four feet wide. Sitting on cut sandstone abutments, the bridge is riveted steel with redwood planking and stringers. It is one of only four remaining bridges of its type in California. Caltrans had it placed on the Historic American Engineering Record in 1985. The bridge's historic significance is related to (1) an important example of early twentieth century engineering in Santa Barbara, and (2) it is an exceptional example of early Twentieth century bridge construction.

Mission Creek Diversion - constructed in 1905. The Diversion was built from massive sandstone blocks stacked a minimum of five courses high. The 40-foot wide diversion runs between the Chapala Street Bridge for 500-feet to a point where Mission Creek crosses Montecito Street. The Diversion is a contributing element to the National Register listed Railroad Depot. A remnant sandstone block revetment runs from the Chapala Street Bridge toward Mason Street along the southwesterly side of Mission Creek. However, the revetment is not considered to be potentially eligible for inclusion in the National Register.

Four other National Register eligible properties are in the APE, but it appears that they would not be directly affected by the project. These include properties at 20 West Mason Street, 118 and 120 Chapala Street and 309-311 West Ortega Street.

There are also two neighborhoods in the APE that are potentially eligible for listing and protection as Historic Districts. The West Downtown Neighborhood (200 and 300 Blocks of West Ortega Street and portions of streets surrounding the Brinkerhoff Avenue Landmark

District) and the Waterfront Neighborhood (including the 100 Block of Chapala Street and Mason Street west of Mission Creek). These neighborhoods are described as follows:

West Downtown Neighborhood - The PHA report suggests that the 200 and 300 Blocks of West Ortega Street may be eligible for inclusion on the National Register as a mostly intact neighborhood representing the late nineteenth and early twentieth centuries. In addition, portions of streets surrounding the Brinkerhoff Avenue Landmark District should be considered for inclusion in this existing city district. The larger district should then be considered for its eligibility for inclusion on the National Register. A more comprehensive survey of these two portions of the West Downtown Neighborhood will be required to properly assess its significance.

Waterfront Neighborhood - The PHA report indicates that significant portions of the Waterfront Neighborhood, including the 00 to 300 blocks of Chapala Street (excluding the Harbor View Inn) and Natoma Avenue and Mason Street between Chapala and Bath Streets should be considered for inclusion in a National Register district. Portions of Cabrillo Boulevard should also be considered for inclusion in such a district. Like the West downtown Neighborhood, a more comprehensive survey of the neighborhood is required to determine its eligibility. A Waterfront Survey is being prepared at this time and is expected to be completed in 2000.

18.1.6.2 Structures Determined to be Eligible for Listing on the California Register of Historic Resources or for Designation as a City Landmark or Structure of Merit

The above-described structures, including the Moreton Bay Fig Tree, the Mission Creek Diversion, the Pony Truss Bridge at Chapala and Yanonali Streets, and 118 and 120 Chapala Street, are also eligible for inclusion on the California Register of Historic Resources. In addition, they are eligible for designation as City of Santa Barbara Landmarks. In addition to the above structures, the following additional structures are not eligible for listing in the National Register of Historic Places but are eligible for listing on the California Register of Historic Resources and/or for designation as a City Landmark or Structure of Merit. A final determination of eligibility for inclusion on the California Register of Historic Resources will be completed following publication of the Final EIS/EIR. It is possible that some sites initially determined to be eligible for inclusion on the California Register will be determined to be ineligible. However, the EIS/EIR has taken the more conservative approach and will mitigate, where feasible, any potential effects on such structures.

15 West Mason Street - built in 1925. This structure is a single-story Spanish Colonial Revival style commercial building. The principal ornamental elements include the building's

moderately pitched side gable terra cotta tiled roof and the façade's plain stucco walls. The scrolled parapet, however, is more frequently associated with the Mission Revival style. This structure was originally built as a parking garage in conjunction with the Hotel Californian, located at State and Mason Streets. In 1927, the building was converted into a bakery and operated as such until 1931. From 1931 to 1949, the building was once again used for auto-related services, including auto repair, a garage and a cab company. After 1949, the building housed several industrial, office and retail uses. Originally, the central entrance at the front of the building functioned as the vehicular entrance to the interior. This building was designated as a Structure of Merit by the City of Santa Barbara Historic Landmarks Commission on January 27, 1988. This is the lesser of two possible designations under the City's Municipal Code. The Structure of Merit designation citation clearly stated that the structure is not eligible for designation as a City Landmark. Landmark status provides greater protection of buildings because demolition is prohibited. The structure is also eligible for inclusion on the California Register of Historic Resources, primarily because it is a City Structure of Merit and it is a contributing element to the Hotel Californian, which is eligible for inclusion on both the National Register of Historic Places and the California Register of Historic Resources. It should be noted that the PHA study indicates that, while this building is important, demolition of 15 West Mason Street would allow for an alternative realignment of Mission Creek that would preserve the historic and structural integrity of the 100 block of Chapala Street and the house at 20 West Mason Street. Preservation of these resources preserve[s] a more significant part of Santa Barbara's architectural and historic integrity.

536 Bath Street - built in 1909. This house is a single-story vernacular bungalow. The principal ornamental elements include a 15-light french door, a large picture window, terra cotta floor tiles, and a Tuscan style roof support column on the southeast corner. The house's historic association is with the noted local photographer, Karl Obert. Obert lived in the house from 1929 to 1934 after immigrating from Germany. Significance comes from this location because this is where he began his American career as a photographer.

116 Chapala Street - built circa 1910-1919. The Colonial Revival house was originally a carriage house before being used as a garage until 1922. At that time, the building was converted for exclusive residential purposes. Its historic value comes from its architectural uniqueness as the sole remaining Early Twentieth Century carriage house in the Waterfront Neighborhood. Architecturally, it represents the transition from the horse-drawn era to motorized transportation.

134 Chapala Street - built in 1960. This building is a single story masonry building with a flat roof covered in rolled composition asphalt sheeting. The building's ornamentation is limited to its west elevation where six concrete panels of decorative concrete grillwork are evenly spaced along the length of an otherwise unadorned wall. The building was built as a business office for the National Cash Register Company, which occupied the building until 1986.

In 1987, the building was occupied by a day care facility, which remains today. It is one of only a few examples in Santa Barbara of postwar corporate modernism, an architectural style that dominated American commercial architecture between 1945 and 1965. The building may be eligible for designation as a City Structure of Merit as the best example of this architectural style in the Waterfront Neighborhood.

Potter Hotel Footbridge - built circa 1905. This footbridge spans Mission Creek just above the north end of the steel pony truss bridge on Chapala Street. The footbridge consists of a single span of concrete, flanked at either end by concrete pillars that once supported lamps. The west end of the footbridge originally opened onto the Potter Hotel grounds through a gap in the creek bank's sandstone wall. This opening still exists, but has been blocked with a chain link and wood gate. This footbridge is one of only two extant structures associated with the Potter Hotel. It was most likely intended for use by hotel porters carrying the luggage of train passengers who were guests at the Potter Hotel. The structure is eligible for designation as a City Structure of Merit.

434 De la Vina Street - built circa 1908-1914. This building is a one and one-half story Craftsman styled double bay duplex (now used as a single family residence). The duplex is sheathed in horizontal tongue-and-groove siding and a veneer of waterworn sandstone cobbles has been applied to the lower three feet of the front elevation. Some elevations of the building have undergone significant modification, including the replacement of wood-framed windows with aluminum sliders. In addition, the wood-shingled roof has been covered with composition asphalt tiles. This house is eligible for designation as a City Structure of Merit. Its primary value is its relationship to the adjacent Brinkerhoff Avenue Historic District.

306 West Ortega Street - built in 1928. This building is a Spanish Colonial Revival flat-roofed frame and stucco house, built by prominent Santa Barbara architect, William Poole. This house may be the only surviving example of his residential design in Santa Barbara. Poole was best known for his commercial architecture, a few examples of which also remain. This house is eligible for designation as a City Structure of Merit and for inclusion on the California Register of Historic Resources.

18.1.7 **Evaluation of Sites Within the Study Area**:

National Register Eligible:

Seven historic properties are in or very near the APE for the proposed Lower Mission Creek Flood Control Project. These include the Chapala Street Bridge, the Mission Creek Diversion near the bridge, houses at 20 West Mason Street, 118 and 120 Chapala Street, and a duplex at 311-313 West Ortega Street. The houses located at 20 West Mason Street, 118 and

120 Chapala Street, and 311-313 West Ortega Street will not be adversely affected. The tree will also be avoided. The PHA report also included evaluations and recommendations for these properties.

California Register and Local Designation Eligible:

All of the structures that are eligible for listing on the National Register are also eligible for inclusion on the California Register. They are also eligible for designation as City Landmarks. The buildings at 15 West Mason Street, 306 West Ortega Street, 116 Chapala Street and 536 Bath Street are eligible for inclusion on the California Register of Historic Resources and designation as a City of Santa Barbara Landmark or Structure of Merit. The Potter Hotel Footbridge, and the buildings at 134 Chapala Street and 434 De la Vina Street are eligible for the City of Santa Barbara Structure of Merit designations.

18.2 THE CITY OF SANTA BARBARA GENERAL PLANS AND POLICIES APPLICABLE TO THE CULTURAL RESOURCES:

Conservation Element Cultural and Historic Resources Goal:

Sites of significant archaeological, historic, or architectural resources will be preserved and protected wherever feasible.

Conservation Element Cultural and Historic Resources Policies

1.0 Activities and development which could damage or destroy archaeological, historic, or architectural resources are to be avoided.

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18.3 IMPACT ANALYSIS:

Of the four alternatives now under consideration, the No Action Alternative is the only one that would fully meet the City's written policy goal. However, after the preferred alternative is selected, all efforts would be made to adhere to this policy statement as fully as possible.

In most of the resource areas, there is very little difference in acceptable mitigation measures between the National Environmental Policy Act (NEPA) and related federal laws and the California Environmental Quality Act (CEQA) and related state laws. Generally speaking, mitigation can be any combination of data recovery, documentation, archival quality photography, reproduction of plans and blue prints, curation, relocation of buildings and structures, and preservation in place.

18.3.1 **Alternative 1 (No Action)**

Known significant cultural resources within the footprint of the Lower Mission Creek are the Chapala Street Bridge, and the Mission Creek Sandstone Revetment Diversion wall on the south side of the creek, and two dwellings that are on both sides of the creek. These resources are all in very good condition and are in minimal present danger from flooding. There will be no adverse effects on these cultural resources.

R 18.3.2 **Alternatives 6, 8, and 12**:

18.3.2.1 **Impacts on National Register Listed or Eligible Properties:**

These alternatives have the potential to require removal of a number of structures that are eligible for inclusion in the National Register of Historic Places. Details on the removal of the structures are listed below:

Alternative 12 (preferred)

There will be no impacts to National Register eligible or listed properties.

Alternative 6

- Chapala Street Bridge - 1920. National Register eligible. Potential for complete removal.
- Mission Creek Diversion - probably built in 1905. Contributing element to the Railroad Depot National Register listed property. Proposed for complete removal. Sandstone blocks would be reused if possible and/or appropriate.

Alternative 8

- Chapala Street Bridge - 1920. National Register eligible. Potential for complete removal.
- Mission Creek Diversion - probably built in 1905. Contributing element to the Railroad Depot National Register listed property. Partial removal from the downstream end of the proposed oxbow culvert to the Chapala Street Bridge. Sandstone blocks would be reused if possible and/or appropriate.

18.3.2.2 **Impacts on Properties Eligible for or Listed on the California Register or Eligible for or Designated as City Structures of Merit or Landmarks:**

All of the properties listed in Section 18.3.2.1 above are also eligible for inclusion on the California Register and for designation as a City Landmark. In addition to those properties, the three construction alternatives would have impacts on the following structures.

Alternative 12 (preferred)

- 15 West Mason Street - 1925. Designated City Structure of Merit. California Register eligible. Potential for complete removal.
- 101 State Street - 1904. Floor City Structure of Merit eligible. Potential for complete removal.
- 134 Chapala Street - 1960. City Structure of Merit eligible. Potential for partial removal. Potter Hotel Footbridge - circa 1905. City Structure of Merit eligible. Potential for complete removal.
- 306 West Ortega Street - 1928. California Register and City Structure of Merit eligible. Potential for complete removal
- 116 Chapala Street - 1921. Originally a carriage house. California Register and City Landmark or Structure of Merit eligible. Potential for complete removal.
- 536 Bath St - 1910. California Register and City Landmark or Structure of Merit eligible. Potential for complete removal.

Alternative 6

- 15 West Mason Street - 1925. Designated City Structure of Merit. California Register eligible. Potential for complete removal.
- 134 Chapala Street - 1960. City Structure of Merit eligible. Potential for complete removal.
- Potter Hotel Footbridge - circa 1905. City Structure of Merit eligible. Potential for complete removal.
- 306 West Ortega Street - 1928. California Register and City Structure of Merit eligible. Potential for complete removal.
- 116 Chapala Street - 1921. Originally a carriage house. California Register and City Landmark or Structure of Merit eligible. Potential for complete removal.
- 536 Bath St. - 1910. California Register and City Landmark or Structure of Merit eligible. Potential for complete removal.

Alternative 8

- 15 West Mason Street - 1925. Designated City Structure of Merit. California Register eligible. Potential for complete removal.
- 134 Chapala Street - 1960. City Structure of Merit eligible. Potential for partial removal.
- Potter Hotel Footbridge - circa 1905. City Structure of Merit eligible. Potential for complete removal.
- 306 West Ortega Street - 1928. California Register and City Structure of Merit eligible. Potential for complete removal.

- 116 Chapala Street - 1921. Originally a carriage house. California Register and City Landmark or Structure of Merit eligible. Potential for complete removal.
- 536 Bath St. - 1910. California Register and City Landmark or Structure of Merit eligible. Potential for complete removal.

18.3.3 **Mitigation**:

18.3.3.1 NATIONAL ENVIRONMENTAL POLICY ACT (NEPA)

Under NEPA, mitigation of cultural resources is confined to those properties that have been evaluated for their eligibility for inclusion in the National Register of Historic Places (NRHP). At that time they become known as "historic properties." Following determinations of eligibility, historic properties are assessed for the criteria of effect and adverse effect. If the project will adversely affect a historic property, mitigation measures will be required to reduce the impacts to a level of no adverse effect.

A possibility exists that ground disturbing activities, especially near archaeological sites CA-SBA-27 and SBA-28, may uncover subsurface deposits. A qualified archaeological monitor will be in place during all ground disturbing activities and he/she will be empowered to halt construction until the situation is resolved. Local ordinances require the presence of a Native American monitor that has traceable hereditary roots to the Barbareño Chumash. The National Historic Preservation Act has no such requirements for Native American monitoring.

Compliance with Section 106:

The project is in compliance with Section 106 of the National Historic Preservation Act. The State Historic Preservation Officer (SHPO) transmitted a letter dated August 3, 2000, that agrees with the Corps' determinations of eligibility, non-eligibility and no adverse effect. The following buildings and structures are eligible for inclusion in the NRHP Places under criterion c.: 118 Chapala Street, 120 Chapala Street, 20 W Mason Street, 309 W Ortega Street, 311/313 W Ortega Street, Chapala Street Pony Truss Bridge, and the Mission Creek Diversion.

The following bridges and buildings are not eligible for inclusion in the NRHP:

Bridge 51C0246 - the Mission Creek Bridge between Bath and De la Vina Street; Bridge 51C0247 - the Mission Creek Bridge at the intersection of De la Vina and Haley Street; Bridge 51C0287 - the Mission Creek Bridge between Chapala and State Street; Bridge 51C0301 - the Mission Creek Bridge between Castillo and Bath Street; 116 Chapala Street; 134 Chapala Street; 29 State Street; 15 W. Mason Street; 129 W. Haley Street; 208 W Haley Street; 434 De La Vina Street; 221 W Cota Street; 230 W Cota Street; 532 Bath Street; 536 Bath Street; 631

Bath Street; 633 Bath Street; 303 W. Ortega Street; 306 W. Ortega Street; 308 W. Ortega Street; and 326 W. De la Guerra Street.

SHPO concurred with our determination that the project as planned will have no adverse effects on properties that are eligible for, or included in, the NRHP. No further work towards Section 106 compliance is required.

18.3.3.2 **CEQA Mitigation**:

CEQA requires the development of specific mitigation measures as part of the Environmental Impact Report. Each of the potentially affected structures is listed below, followed by mitigation measures that would apply to the property.

116 Chapala Street

Preferred Mitigation: A minor realignment of the channel to the east would be the preferred mitigation. This approach would not result in any disturbance of or adverse impacts on the property.

Acceptable Mitigation: Relocation of the house on-site by moving it forward. It should be moved forward the minimum amount necessary to protect the structure.

Partial Mitigation: Relocate the building off-site, preferably elsewhere in the immediate neighborhood following full Historic American Building Survey/Historic American Engineering Record (HABS/HAER recordation of the structure and photographic documentation of its place in the neighborhood.

Chapala Street Pony Truss Bridge

Preferred Partial Mitigation: Extend the box culvert downstream of the Chapala Street Bridge on the easterly side of the existing channel. As indicated in the PHA report, this approach may compromise the visual integrity of the existing bridge when viewed from downstream. However, this may ultimately depend upon the final design of the box culvert extension.

Other Partial Mitigation Options: 1) Re-use significant portions of the railings or trusses from the existing bridge in the replacement bridge. 2) Create a pedestrian footbridge using the steel trusses set perpendicular to Chapala Street.

Mission Creek Diversion

Preferred Mitigation: Extend the box culvert downstream of the Chapala Street Bridge on the easterly side of the existing channel.

Partial Mitigation: Dismantle those portions of the Diversion affected by the project and reuse as the wall surface in the new creek channel. In addition, prepare full HAER recordation.

536 Bath Street

Preferred Mitigation: Redesign of the channel to extend the vertical wall proposed under the Cota Street Bridge beyond the building. A slight realignment of the proposed channel might also be necessary.

Acceptable Mitigation: Relocation of the house on-site by moving it forward after completing HABS recordation. This may not be feasible because the front of the house is already close to Bath Street. Another acceptable alternative would be to relocate the house on another property in the same neighborhood, photographic documentation and preparation of a biographical history of Karl Obert shall be undertaken. Either of these two relocation alternatives would reduce impacts to adverse, but less than significant.

15 West Mason Street

Preferred Mitigation: Redesign the project to avoid this structure.

Partial Mitigation: Full HABS recordation of the building shall be completed. In addition, a photographic study of its relationship to the neighborhood shall be prepared and a short history of the building that places it in its historical and architectural context shall be commissioned.

134 Chapala Street

Acceptable Mitigation: Full HABS recordation of the building shall be completed. In addition, a photographic study of its relationship to the neighborhood shall be prepared and a short history of the building that places it in its historical and architectural context shall be commissioned.

Potter Hotel Footbridge

Preferred Mitigation: Extend the box culvert downstream of the Chapala Street Bridge on the easterly side of the existing channel or other wise redesign the project to avoid the footbridge.

Partial Mitigation: Relocate the bridge offsite, preferably to a location that has historical ties to the Potter Hotel or the railroad station, such as Plaza del Mar Park, Ambassador Park or Depot Park, in consultation with the City Historic Landmarks Commission. In addition, complete full HABS/HAER recordation of the footbridge prior to its removal.

434 De la Vina Street

Acceptable Mitigation: Full HABS recordation of the building shall be completed. In addition, a photographic study of its relationship to the neighborhood shall be prepared and a short history of the building that places it in its historical and architectural context shall be commissioned.

306 West Ortega Street

Preferred Mitigation: Begin the proposed vertical wall that would extend under the Ortega Street Bridge further upstream to avoid the building. It may also be necessary to slightly realign the channel to protect this building.

Acceptable Mitigation: Relocate the house on site by moving it away from the channel. Prior to relocation, a photographic study of its relationship to the neighborhood shall be prepared.

Partial Mitigation: Relocate the house elsewhere in the neighborhood after completing full HABS/HAER recordation and additional documentation of William Poole to determine his significance to the architectural heritage of the City, State and Nation.

West Downtown Neighborhood

Preferred Mitigation: Protect the potentially affected buildings on-site as outlined for 306 West Ortega Street above. Working with the City of Santa Barbara Historic Landmarks Commission and City staff, complete a full evaluation of the neighborhood's eligibility for inclusion on the National Register, California Register or City designation. Establish the boundaries of such a district and complete a neighborhood context.

Waterfront Neighborhood

Preferred Mitigation: Working with the City of Santa Barbara Historic Landmarks Commission and City staff, complete a full evaluation of the neighborhood's eligibility for inclusion on the National or California Register or City designation. Establish the boundaries of such a district. A neighborhood context has already been completed for this neighborhood as part of the City's Waterfront Survey.

Archaeological Sites

Preferred Mitigation: A qualified archaeologist and a Native American monitor who can show descent from the Barbareño Chumash shall be onsite during all excavation in or near potentially affected archaeological sites. If deposits are found, work shall be stopped , pursuant to 36 CFR 800(b) *Discoveries without prior planning,* to determine the significance of the find and, if necessary, complete appropriate recovery procedures. Excavation may be redirected to areas outside of the area of the find if appropriate monitors are available.

18.4 RESIDUAL IMPACTS:

This project will result in significant and unavoidable cultural resources impacts due to the complete or partial removal of the following structures:

- Chapala Street Bridge (National Register eligible). However, the careful extension of the box culvert to the south side of the bridge in such a way that it would not affect the visual integrity of the bridge, when looking upstream at the bridge may reduce the impacts to less than significant.
- Mission Creek Diversion (Contributing element to National Register listed property). However, extension of the box culvert south of the Chapala Street bridge would reduce impacts to less than significant.
- Potter Hotel Footbridge. However, if the project is redesigned to avoid this structure, there would be no adverse impacts.
- West Downtown Neighborhood (Portions may be National Register eligible). If the historic buildings on the 300 Block of West Ortega Street are avoided or relocated on-site, impacts will be reduced to less than significant.
- Waterfront Neighborhood (Portions may be National Register eligible). If the historicstructures in the 100 block of Chapala, the Chapala Street Bridge and the Potter Hotel Footbridge remain in place, impacts will be reduced to less than significant.

The mitigation measures proposed for the remaining historic sites and for the archaeological sites are sufficient to reduce impacts to less than significant.

SECTION - 19 - UTILITIES

19.1 LOCATIONS AND TYPE OF EXISTING UTILITY LINES WITHIN THE PROJECT AREA:

Underground utility maps are were available through the City of Santa Barbara, and drawings on file at the Los Angeles District. It should be noted that the location of these utilities are approximate. Lower Mission Creek flows through the residential and commercial area of the City of Santa Barbara; therefore, many water and sewer lines are located within the project area. The location of each utility line is identified by Street crossing or bridge location. The project area is bounded by Canon Perdido Street on the north and Cabrillo Boulevard on the south. All utility lines are underground except one water line located at Cabrillo Boulevard. Only one MCI telephone line is located within the project area. Relocation of these utility lines is dependent upon the replacement of the bridges. The decision for replacement of the bridges will be made after developing the alternatives and design for the project.

19.1.1 Water Lines:

Canon Perdido and Castillo Streets:

Two water lines are located in the vicinity of Canon Perdido and Castillo Street. A 6-inch Cast Iron (CI.) water line is located parallel to Canon Perdido Bridge and a 12-inch CI. water line is located parallel to Castillo Street Bridge.

De la Guerra Street Bridge:

An 8-inch diameter (CI.) water line is located at De la Guerra Street Bridge at a depth of about 26-inches under ground and runs parallel to De la Guerra Street.

Ortega Street Bridge:

A 6-inch diameter (CI.) water line is located at a depth of about 34-inches at Ortega Street Bridge.

Bath Street Bridge:

A 8-inch diameter (CI.) water line Pipe runs parallel to Bath Street.

Cota Street Bridge:

A 6-inch diameter (CI.) water line is located at a depth of about 31-inches parallel to the Cota Street Bridge.

De la Vina and Haley Street Bridge:

A 6-inch diameter (CI.) Water line is located across the De la Vina Street Bridge. This pipeline is located at a depth of 26 inches.

Gutierrez Street Bridge:

A 12-inch diameter (CI.) water line is located at the Gutierrez Street Bridge. This water line runs parallel to the Gutierrez Street Bridge.

Montecito Street Bridge:

A 4-inch diameter (CI.) water line is abandoned at the Montecito Street Bridge and a new 8-inch diameter (P.V.C.) water line runs across the bridge (depth is not shown).

Yononali and Chapala Streets Bridge:

One water line of 6-inch (CI.) is abandoned at the Chapala Street Bridge and a new 12-inch diameter (P.V.C) water line is installed at a depth of about 19 inches.

Mason Street:

An 8-inch CI. water line is located at a depth of approximately 22 inches at Mason Street.

Cabrillo Boulevard and State Street:

At the Cabrillo Boulevard Bridge, a 14-inch diameter (P.V.C.) water line is installed at the downstream side of the bridge. A 8-inch diameter (CI.) water line is located downstream of the bridge.

An 8-inch diameter (P.V.C.) water line with a 10-inch casing is installed at the State Street Bridge. This line passes across the Creek. But after crossing the creek, the water line runs underground at about a depth of 31 inches.

19.1.2 **Sewer Lines:**

Canon Perdido and Castillo Street Bridges:

A 12-inch sewer line runs along Canon Perdido Street and a 4-inch diameter C.I. line is located at Castillo Street. Three Man-Holes are located in the middle of the street.

De la Guerra Street Bridge:

No sewer line located on this bridge.

Ortega Street Bridge:

A 6-inch diameter sewer line runs along Ortega Street.

Cota Street Bridge:

No sewer lines are located in this area.

Bath Street Bridge:

Two 10-inch diameter PVC (double syphon) lines are located at Bath Street.

De la Vina and Haley Streets Bridge:

A 8-inch diameter Vitrified Clay Pipe (V.C.P) sewer line is located along the crossing of Haley and De la Vina Streets, and one sewer line is abandoned.

Gutierrez Street Bridge:

Two 8-inch diameter sewer lines run along Gutierrez Street across the bridge.

Mason Street Bridge:

No sewer line is located in this area.

Yononali and Chapala Streets Bridge:

A 12-inch diameter sewer line of Vitrified Clay Pipe (V.C.P.) is located at the corner of Chapala and Yanonali Streets.

Cabrillo Boulevard and State Street:

A 10-inch diameter sewer line (PVC) is installed parallel to State Street.

19.1.3 **Telephone Lines:**

A MCI Telephone line is installed parallel to Cota Street. This telephone line is installed underground.

19.2 **Project Related Impact:**

Impacts would be significant if construction of the proposed project resulted in substantial disruption in utility services, an increased demand from existing facilities, including water, sewer, storm water drainage, solid waste, natural gas, electric power, and telephone service, or if relocation of utility lines resulted in accidental spills. The potential for spills is discussed in the Water Quality Section.

19.2.1 **Relocations of the Utility Lines and Responsible Agency**

Utility relocation will be part of bridge replacement and will be performed by the local sponsor.

19.2.2 **Alternative 1- No Action (Without Project Conditions):**

No change in existing conditions. No impacts would occur to utility services.

19.2.3 **Alternatives 12, 6 and 8:**

Ten (10) water lines, ten (10) sewer lines and one (1) telephone line are located within the project reach. Relocation of these utility lines would be required during excavation of the creek banks, bottom and replacement of bridges. Most of the utility lines are located along the bridges.

Residents may experience temporary loss of services for short periods. However, relocation of utility lines would be performed in such a manner as to minimize disruption in service and accidental spills. If there is disruption, property owners and tenants will be notified in advance. The project would not result in long-term or permanent service disruption; therefore, no significant impacts would occur due to construction of the project.

19.2.4 **Future Maintenance:**

No impacts to utility services.

19.3 **Mitigation**:

- Prior to relocation of utility lines, the property owners and tenants should be notified.

19.4 **RESIDUAL IMPACTS**

No residual impacts would occur to utilities due to implementation of the project.

SECTION - 20 - CUMULATIVE IMPACTS

20.1 INTRODUCTION:

This section is included in the EIS/EIR to address the cumulative impacts associated with the completion of the project and the General Plan buildout of the current City of Santa Barbara General Plan and Local Coastal Plan. In addition, reasonably foreseeable future projects (currently approved and proposed) within the City of Santa Barbara are considered. Federal regulations implementing NEPA (40 C.F.R. §§1500-1508) require that the cumulative impacts of a proposed action be assessed. NEPA defines a cumulative impact as an *"impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions"* (40 C.F.R. §1508.7). CEQA Guidelines require a discussion of significant environmental impacts that would result from project-related actions in combination with "*closely related past, present, and probable future projects*" located in the immediate vicinity (CEQA Guidelines §15130(b)(1)(A)). These cumulative impacts are defined as "*two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts*" (CEQA Guidelines §15355). In accordance with CEQA Guidelines, Section 15130, cumulative impacts need not be evaluated in as much detail as that required for the effects attributable to the project alone. The discussion should be guided by the standards of practicality and reasonableness. The following elements are necessary for an adequate discussion of cumulative impacts:

- A list of relevant past, present and reasonably anticipated future projects, or a summary of projections contained in an adopted general plan or related planning document which is designed to evaluate regional or area-wide conditions.
- A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available.
- A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable options for mitigating or avoiding any significant cumulative effects of a proposed project.
- With some projects, the only feasible mitigation for cumulative impacts may involve the adoption of ordinances or regulations rather than the imposition of conditions on a project-by-project basis.

Cumulative impacts may be discussed in terms of project impacts in combination with impacts anticipated for future development (including approved and planned development in the project area and surrounding affected area). The geographic area for each impact varies,

depending on the nature of the impact, whether it is regional, such as air quality, or local, such as noise.

Quantification of cumulative impacts for this project is difficult, as it would require speculative estimates of impacts including, but not limited to, the following: the geographic diversity of impacts (impacts from future development may affect different areas); variations in the timing of impacts (many of the project's and future development's impacts, particularly short-term impacts, would occur at different times, and could be reduced or removed before other short-term impacts occurred); complete data are not available for all future development potentially affected by or related to the project; and future development may change based upon future changes to the City's General Plan and Local Coastal Plan, particularly related to development along creeks.

The following cumulative impact analysis takes into consideration existing conditions plus the proposed project, in combination with projects currently pending or approved but not yet built within the Downtown and Waterfront areas of the City of Santa Barbara. A list of reasonably foreseeable future projects is included in Table 20.1-1 below. It should be noted that flood control project construction is not scheduled to begin until 2003. Most of the projects included in this table would be either completed or abandoned by the time the flood control project is complete. However, it is likely that there would be other projects within the affected area that may have similar impacts and concerns.

Table 20.1-1
List of Reasonably Foreseeable Future Projects

	Address	Project Description
*Projects within the lower Mission Creek 100-Year Floodplain **Projects immediately adjacent to Mission Creek (may or may not be in floodplain)		
Pending Project Applications		
1.	634 Anacapa St.	Replace 6,185 sf ironworks with 32,000 sf high tech & 2 residential units
2.	633 E. Cabrillo Blvd.	Expansion of conference facility maximum use from 1,000 to 1,800 people & removal of peak hour restrictions
3.	301 W. Cabrillo Blvd.*	Restaurant & office addition of 1,187 sf & outdoor customer waiting area at Sea Landing
4.	336 W. Cabrillo Blvd.*	Addition of 2 hotel rooms
5.	335 W. Carrillo St.	Residential - 44 units
6.	22 Castillo St.*	6 room addition to existing hotel
7.	328 Chapala St.	Mixed use - 18 residential units & 12,866 sf retail (would replace # 21)
8.	423 Chapala St.**	Expansion of Salvation Army facility from 8,124 sf to 17,300 sf
9.	614 Chapala St.	5,799 sf addition for high tech industry
10.	418 W. De la Guerra St.	Residential – 6 units
11.	123 w. Gutierrez St.**	1,210 sf office addition
12.	122 Helena Ave.*	Residential addition - 4 units
13.	22. E. Montecito St.*	72 room hotel replacing 14,900 sf topless juice bar, adult book store & bar
14.	535 E. Montecito St.	40,610 sf Office on vacant parcel
15.	518 State St.	3,915 sf high tech & 5 residential units replacing newsstand
16.	502 Vera Cruz Ln.	1,365 sf storage addition
17.	700 Block Cliff Dr.	Santa Barbara City College Long Range Development Plan amendments - increase from 12,000 to 15,000 students; addition & remodel of classrooms to serve additional students & staff
Approved Project Applications		
18.	202 E. Cabrillo Blvd.**	Skateboard Park

Address		Project Description
19.	555 E. Cabrillo Blvd.	150 room luxury hotel
20.	100 W. Carrillo St.	49,600 sf super market
21.	328 Chapala St.*	Mixed use – 11,575 sf office/retail & 10 residential units
22.	502 E. Gutierrez St.	3,000 sf office addition
23.	1035 Chapala St.	35,000 sf high tech
24.	915 Garden St.	23 room hotel
25.	815 E. Haley St.	1,200 sf commercial & 1 residential unit addition
26.	132 Harbor Way*	3,249 sf office & retail addition
27.	222 N. Milpas St.	3,000 sf addition to super market
28.	12 E. Montecito St.*	100 bed hostel
29.	403 E. Montecito St.	7,666 sf office
30.	200 W. Montecito St.*	7,480 sf furniture store & 1 residential unit
31.	531 E. Ortega St.	4,500 sf addition to Girls Inc.
32.	815 E. Quinientos St.	15,000 sf industrial replacing 1 residential unit
33.	325 N. Quarantina St.	2,522 sf office replacing 1 residential unit
34.	32 N. Salsipuedes St.	358 sf office for U-Haul Concrete
35.	230 Stearns Wharf	39 sf & 26 seat addition to restaurant
36.	20-120 State St.*	Replace 94 room hotel & 37,000 sf retail & restaurant with 81 time shares, 17,352 sf retail & restaurant & 2,500 sf visitors center
Project Applications with Building Permits Issued		
37.	820 Bond Ave.	1,200 sf commercial & 9,000 sf storage
38.	28 W. Cabrillo Blvd.**	15 room addition to existing hotel, replacing beach rental
39.	31 W. Carrillo St.	Replace 174 room retirement hotel with 100 room hotel
40.	204 E. Gutierrez St.*	3 residential units
41.	113 Harbor Way*	2,744 sf & 86 seat theater addition to maritime museum
42.	811 E. Mason St.	2,600 sf retail replacing 1 residential unit
43.	209 Santa Barbara St.*	1,000 sf commercial addition
44.	920 Summit Rd.	Montecito Country Club - Remodel of clubhouse & 4,795 sf addition for maintenance bldg., tennis pavilion

20.2 AFFECTED RESOURCES:

After reviewing the various resources areas, it has been determined that there would be no cumulative impacts in the areas of geology, water resources, noise, biological resources, socioeconomics, aesthetics/visual resources, recreation, hazardous, toxic or radioactive waste, cultural resources or safety. A discussion of the resources for which there is some potential for cumulative impacts follows.

20.2.1 Land Use:

Cumulative development projects in the floodplain for lower Mission Creek include several projects listed in the table above. All of these projects have been designed so that their base elevation is above the present floodplain. In addition, those projects that are immediately adjacent to Mission Creek have been designed so that they would not be affected by the project alignment of the Lower Mission Creek Flood Control Project. Potential cumulative impacts of the proposed project, in combination with the cumulative development projects in the Downtown and Waterfront areas of the City, would not require mitigation nor are they expected to produce any impact to surrounding land uses or the local environment. The project would not cause a change in existing land use on the project site or result in conflicts with nearby land uses. As a result, project implementation would not contribute to cumulatively significant land use impacts.

The construction of the proposed project would not result in future density changes in terms of the City General Plan or Local Coastal Plan. Commercial projects are limited to minor additions (up to 1000 sf), small additions (up to 3,000 sf), and Community Priority and Economic Development projects. The base commercial zoning actually allows more commercial development than is allowed under City Zoning Ordinance §28.87.300. Most commercially zoned properties in the area are either already built out or would be able to accommodate the limited additional square footage allowed by City zoning requirements. This would be the same with or without the flood control project. For residentially zoned properties, a review of the vacant and underdeveloped properties along the creek indicates that the allowable number of units on properties would not increase overall. Some individual properties might change configuration enough to result in the allowance of a small number of additional units. However, the number of parcels that would have a reduction in allowed density and the loss of units that would result from project construction would offset this. Therefore, this project would not contribute to significant cumulative impacts related to the build out of the City General Plan or Local Coastal Plan.

20.2.2 Air Quality:

Due to the nature of the project as a flood control facility, it would not have any significant long-term effect on air quality, nor would it contribute to a significant cumulative impact on air quality. The Santa Barbara County Air Pollution Control District does not consider the construction of most projects to contribute to short-term impacts. In addition, if a project does not result in long-term air quality impacts and is consistent with the Clean Air Plan, it is generally not considered to add to cumulative air quality impacts. The Lower Mission Creek Flood Control Project would not result in long-term air quality impacts and is consistent with the CAP; therefore, it does not contribute to long-term cumulative air quality impacts. During construction, this and other projects would contribute to short-term air quality effects. However, these effects are not considered to be significant. Other projects would result in increases in traffic that would lead to long-term cumulative effects on air quality; however, because the project would not result in long-term traffic or air quality impacts, the project would not contribute to these cumulative impacts.

20.2.3 **Traffic**:

Cumulative traffic impacts would be very similar to cumulative air quality impacts. The proposed project would not have any long-term effects on traffic, nor would it contribute to long-term cumulative traffic impacts. During construction, this and other projects would contribute to short-term traffic impacts. However, these impacts are not considered to be significant.

20.3 **CONCLUSION:**

This project will not contribute to significant long-term cumulative impacts. Therefore, it will not be necessary to propose mitigation measures. There will be no residual cumulative impacts.

SECTION - 21 -
RELATIONSHIP BETWEEN LOCAL SHORT-TERM USES OF THE ENVIRONMENT AND THE MAINTENANCE AND ENHANCEMENT OF LONG-TERM PRODUCTIVITY

NEPA (40 C.F.R. § 1502.16) requires that an EIS address the relationship between short-term uses of the environment and the impacts that such uses may have on the maintenance and enhancement of the long-term productivity of the affected environment. Of particular concern are impacts that would narrow the range of beneficial uses of the environment. This refers to the possibility that choosing one alternative reduces future flexibility in pursuing other options, or that transforming land or other resources to a certain land use often eliminates the possibility of other uses being performed at that site.

Short-term uses resulting from the proposed action are associated with construction activities. Construction-related impacts include short-term impacts adverse, but not significant impacts, on air quality from increased fugitive dust (PM_{10}) emissions and traffic. However, minor and short-term emissions and traffic would cease upon completion of construction. These impacts would be short-term and would not affect the long-term productivity of these resources.

A short-term loss of sensitive riparian/wetland communities would occur from implementing the proposed action. However, these losses would be mitigated. These losses come as a tradeoff to providing long-term flood control for the residents and businesses in the area.

The proposed flood control project would reduce public health and safety risks from flooding dangers. In addition, the provision of habitat expansion zones and passive park spaces would enhance recreational amenities in the area. The provision of flood control would, therefore, also serve beneficial long-term uses of the environment.

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SECTION - 22 - UNAVOIDABLE ADVERSE ENVIRONMENTAL EFFECTS

NEPA regulations (40 C.F.R. § 1502.1) and CEQA Guidelines (§ 15126.2[b]) require a description of any significant unavoidable impacts, including those that can be mitigated, but not to a level less than significant.

The environmental effects of the Lower Mission Creek Flood Control Project are discussed in Chapters 5 through 20 of this document. The analyses in these sections determine whether implementation of an alternative would result in significant adverse impacts in any of the specific environmental issue areas. A significance threshold was defined for each issue and for each potential impact addressed in the above-stated Chapters. When significant adverse impacts were identified, mitigation measures were developed that would reduce impacts to below the threshold of significance. In most cases, the potential impacts identified as significant can be adequately reduced to levels less than significant through incorporation and implementation of the appropriate mitigation measures.

Some significant impacts, however, cannot be fully mitigated or reduced below their respective significance thresholds by reasonably practicable measures. The significant environmental effects that cannot be avoided with implementation of the alternatives are as follows:

Loss of cultural resources that have been determined to be significant under the California Environmental Quality Act, including 15 West Mason Street.

Short-term noise impacts to sensitive receptors in the vicinity of the construction site resulting from noise from construction activities (includes residents living in the vicinity of the project area.

Social impacts from residential relocation.

Short-term visual resources impacts from the loss of skyline trees and other vegetation until new vegetation grows.

Short-term traffic impacts in the vicinity of the construction site.

SECTION - 23 - IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES INVOLVED

Both NEPA (40 C.F.R. § 1502.16) and CEQA Guidelines (Section 15126.2[c]) require analysis of significant irreversible and irretrievable commitments. *Irreversible commitments* are damages to the environment that cannot be reversed, even after the life of a project. *Irretrievable commitments* are those that are lost for a long period of time. This includes the use of nonrenewable resources, such as metal, wood, fuel, paper, and other natural or cultural resources. These resources are considered committed because they would be used for the proposed action when they could have been conserved or used for other purposes. Another impact that falls under the category of the *irreversible* and *irretrievable commitment* of resources is the unavoidable destruction of natural resources that could limit the range of potential uses of that particular environment.

There would be irreversible loss of riparian/wetland habitat with implementation of the proposed action. All of the alternatives would result in the irreversible displacement of residential buildings and commercial structures, including historic structures, within the project footprint.

Construction of the flood control modifications would result in an irretrievable commitment of building materials, as well as fuel for construction vehicles and equipment. In addition, the proposed action would commit workforce time for construction, engineering, and environmental review and compliance; and for project operation and maintenance.

Therefore, the commitments of resources that would be considered irreversible would be the use of the material resources and human labor to construct and maintain the flood control project.

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SECTION - 24 - MITIGATION MEASURES/ENVIRONMENTAL COMMITMENTS

24.1 GENERAL:

Sections 6 thorough 20 address impacts related to the project implementation and future maintenance. Mitigation measures are developed for each resource to minimize project related impacts. The mitigation measures/environmental commitments are summarized in the following paragraph.

24.2 WATER RESOURCES:

Construction-Related Mitigation Measures:

- The creek channel upstream of construction activity shall be dammed temporarily to prevent water from entering the reach under construction. A diversion pipe shall be installed in the creek to convey any creek water around the construction area for discharge downstream of the construction activity.

- Construction equipment shall be in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work. The selected contractor shall develop and implement a spill prevention and remediation plan.

- Construction supervisors and workers shall be instructed to be alert for indications of equipment-related contamination such as stains and odors. Construction supervisors and workers shall be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan if indications of equipment-related contamination are noted. Construction equipment shall only be operated within dewatered areas of the creek.

R - No construction or sediment removal would occur anywhere within the project area between December 1 and March. Project construction and sediment removal in the estuary would be accomplished between June 1 and November 30 when water flow is usually at a minimum. Construction upstream from the estuary could be accomplished between April 15 and November 30, provided that no continuous surface flow exists. Water flowing deeper than ½ an inch through the Caltrans Channel between April 15 and June1 would require temporary cessation of construction activities in the streambed.

- Measures to reduce turbidity during the construction of the project and periodic future maintenance would include installation of pipe, as needed, as well as creation of low-flow channels around construction and debris removal operations to divert water flow and avoid mixing of loose dust particles into creek flow. Details of these mitigation measures are:

1) Pipe culverts will be placed in the low flow stream where the stream must be crossed on a regular basis. No work will be allowed in the flowing water except as absolutely necessary (as determined by the Flood Control District and concerned resource agencies).

2) Construction of temporary low-flow channels within the creek during debris removal operations to minimize turbidity and provide habitat for aquatic species. The low-flow channel would be constructed around and away from debris removal operations. Project biologists would develop criteria for the low-flow channels.

3) Conditions identified in the federal and state permits (Section 404 permit and Section 401 Water Quality Certification and 1601/1603 Streambed Alteration Agreement) shall be followed during construction and future maintenance as applicable.

R **<u>Mitigation Measures for Future Maintenance</u>:**

- All routine maintenance shall be accomplished between August and mid-October.

- A pair of silt curtain fences shall be set across the low flow channel not more than 100 yards downstream of the work area; the fences shall be approximately 10 yards apart.

R - If storm events do not reduce conveyance more than 15% then the next maintenance cycle shall involve only mowing of vegetation.

R - During those maintenance cycles when the County determines silt removal has become necessary, all plants and deposits would be removed. As the final step during maintenance, the pilot channel would be rebuilt following the path where a natural channel had gradually come into being, or where the pilot channel had been if hydraulic processes have not already shifted and reshaped it.

R - A swath half the channel wide shall then be mowed or brushed to suppress the growth of potentially large perennials, first along one side as seems convenient for an arbitrary distance (say, 250 feet), then switching to the opposite bank for

another arbitrary distance. The pilot channel would not be disturbed.

R • If sediment removal is not needed the year after, then the other half of the channel would be mowed and brushed. The pilot channel would not be disturbed.

R • If storm events of the next winter rains leave enough sediments to warrant their removal, then during the following summer the full width of that section of the creek would be groomed to remove obstructing sediments and plants. The pilot channel would be rebuilt where a natural channel had gradually come into being, or where the pilot channel had been if hydraulic processes have not already shifted and reshaped it.

- No discharge of oil or spill of contaminated material shall be allowed within the creekbed (conditions identified above would be followed during future maintenance).

- BMPs will be employed to avoid excessive impacts to water quality.

24.3 AIR QUALITY:

Construction-Related Mitigation Measures:

- The selected contractor shall water the excavation site, storage piles and unpaved roads twice each day of construction; once in the morning and at the end of the construction day; this mitigation is applicable for both construction and future maintenance.

- Trucks transporting excavated material shall be covered to reduce fugitive dust.

- Limit vehicles speed to 15 mph maximum within the construction site and maintenance areas (construction and future maintenance), and cease grading and earth movement when wind speeds exceed 20 mph, or as specified by SBCAPCD, during construction and future maintenance activities.

24.4 NOISE:

Construction-Related Mitigation Measures:

- Operation of heavy equipment shall be limited to the hours between 8:00 a.m. and 5:00 p.m. Truck transportation shall be permitted between 7:00 a.m. and 7:00 p.m., Monday

through Saturday. No operation of heavy equipment or truck transportation shall occur on Sundays and holidays.

- Truck traffic shall be limited to the designated truck routes, as determined in cooperation with the City of Santa Barbara Transportation staff.

- The selected construction contractor shall follow the noise ordinance established by the City of Santa Barbara.

- The City will notify property owners and tenants within the project area prior to project construction in their area.

R 24.5 **BIOLOGICAL RESOURCES:**

Construction-Related Mitigation Measures Within the Streambed:

- To avoid impacts to aquatic resources, no construction equipment shall be operated within the channel and stream bottom between December 1st and the end of March 30th or whenever significant water flows pass down Mission Creek.

R - All construction work **downstream** of Yanonali Street shall be performed after June 1, provided no significant stream flows are occurring in Mission Creek.

R - To avoid impact to steelhead and tidewater goby, which are federally listed species, construction **upstream** of Yanonali Street shall be restricted to dates between June 1 and December 1st if water flow in the Caltrans Channel is more than ½ inch deep. If no continuous surface water flow exists in the Caltrans Channel after April 15th, construction could occur from then until December 1st.

- No construction should occur in the flowing water. If water is present during the construction, the water shall be diverted by construction of a low flow channel or installation of a pipe.

R - A qualified biologist (knowledgeable of steelhead and tidewater goby) shall monitor project construction in critical times, (during de-watering of the creek, or installation of pipes in the creek). Monitoring would be performed every week at the beginning of construction and every other week after establishment of the project construction.

- Minimize adverse effects during construction and subsequent maintenance to steelhead

and tidewater gobies.

- Implement a design which causes no constriction to the creek bed, and hence no increase of water velocity compared to existing conditions.
- Create flow conditions conducive to the passage of steelhead through the length of the project on Mission Creek.

- Preclude the chance of steelhead entering the lower end of the proposed by-pass culvert at stream discharges less than the average annual flow, 640 cubic ft/sec by construction of an appropriately sized weir between Gutierrez Street and the upper end of the culvert

- Provide permanent refuges appropriate to both fish species.

- Permanently expand by more than double the estuary's volume.

- Restore an important measure of natural heterogeneity in flow characteristics to the riverine portion of the streambed through the creation of boulder fields.

R **Construction-Related Mitigation Measures for Native Plants on Riprap-Stabilized Banks and Habitat Expansion Zones**:

- Temporary, above-ground irrigation systems shall be installed and maintained for five years to ensure that planted trees/vegetation are established.

- Invasive weeds (principally giant reed, castor bean, salt cedar, and sweet fennel) shall be removed at least twice a year for the first two years, and annually for the next three years, allowing the native riparian vegetation time to become established with minimal competition from unwanted weedy species.

- Any native trees which die within the first five years shall be removed and replaced by the same species from 1-gallon locally-grown and collected stock. The local sponsor would maintained the planted vegetation for the life of the project.

- The growth rates of the trees and shrubs shall be documented for five years. If the plants do not meet pre-determined growth and survival rates, actions shall be taken to improve growing conditions such as fertilization, increased irrigation and replanting.

- For the first year after completion of construction, the stream bank corridors and habitat expansion zones shall be monitored every three months.

- Monitoring/maintenance of the planted vegetation along the creek banks and habitat expansion zones would be required for five years or until vegetation has been established. The local sponsor would maintained planted vegetation for the life of the project after meeting its success criteria.
- For the first two years, the U.S. Army Corps of Engineers or their construction contractor would be responsible for monitoring and maintenance of the planted trees. The remaining three years of monitoring and maintenance would be performed by the Santa Barbara County Flood Control District.

- Monitoring of the planted vegetation must be performed twice a year for five years.

- At each monitoring period, a monitoring report shall be prepared. After completion of monitoring of vegetation for five years, a final report shall be prepared.

- Achieve 90% success of the planted vegetation at end of five years of planting, and ensure that vegetation survival rate is equivalent to the success criteria identified in table #1 of the Mitigation Monitoring Plan. If 90% success of the planted vegetation is not achieved after five years, the local sponsor would ensure achievement of 90% success of the planted vegetation.

- A final revegetation plan shall be prepared by a qualified biologist which includes the above-stated mitigation measures, indicates how plants and seeds will be collected and grown for the project, and defines success criteria and monitoring in more detail.

Construction-Related Mitigation Measures for Moreton Bay Fig:

- An arborist with knowledge of root systems of large ornamentals shall monitor bypass culvert construction to minimize impacts to the Moreton Bay Fig tree.

- Any large roots exposed shall be medicated appropriately to minimize damage to the Moreton Bay Fig tree.

Mitigation Measures for Future Maintenance:

- All routine maintenance shall be accomplished between August and mid-October.

- A pair of silt curtain fences shall be set across the low flow not more than 100 yards downstream of the work area; the fences shall be approximately 10 yards apart.

- Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and California Department of Fish and Game and relocated promptly to a suitable refuge. A written report describing in detail any such relocations shall be submitted to National Marine Fisheries Service.

- Mechanized equipment would enter the creek via the access way at the parking lot of the church at Canon Perdido Street, that at Cota Street, or that immediately adjacent to the oxbow.

R - If storm events do not reduce conveyance more than 15% then the next maintenance cycle shall involve only mowing of vegetation.

R - A swath half the channel wide shall then be mowed or brushed to suppress the growth of potentially large perennials, first along one side as seems convenient for an arbitrary distance (say, 250 feet), then switching to the opposite bank for another arbitrary distance. The pilot channel would not be disturbed.

R - If sediment removal is not needed the year after, then the other half of the channel would be mowed and brushed. The pilot channel would not be disturbed.

R - If storm events of the next winter rains leave enough sediments to warrant their removal, then during the following summer the full width of that section of the creek would be groomed to remove obstructing sediments and plants. The pilot channel would be rebuilt where a natural channel had gradually come into being, or where the pilot channel had been if hydraulic processes have not already shifted and reshaped it.

- A front end loader or road grader working together with dump trucks (10 yd^3) would be used for the bulk of sediment and vegetation removal.

Environmental Commitments for Maintenance of the Structural Features:

Maintenance of side baffles, ledges, and mid-stream boulder clusters —

- Sediments would be removed from among boulder clusters and large rocks of the side baffles only as needed to prevent them from being covered completely

- If necessary, sediments shall be dug from the downstream side of boulders with a backhoe equipped with a 3 foot bucket, then dragged toward the center of the creek to be

combined with streambed sediments being removed as described previously.

- Any individual boulders that might have been dislodged mechanically or displaced by currents would be pushed back into a suitable vacant spot in the baffle and reset.

- Any propagules of giant reed or salt cedar that have taken root shall be eliminated. A combination of foliar application of glyphosate or digging out rhyzomes with hand tools could be employed. Application of herbicides should be very limited, confined to only those small locations where the most persistent and aggressive weedy plants begin to re-invade the creek bottom.

- The remaining growth shall be cut back using a brush hog, or similar mowing attachment passed a couple feet over the tops of the rocks. The intent is to cut down woody species before they attain much height or stem expansion, but not to eradicate low-growing herbaceous plants that offer negligible friction to water currents.

- All environmental commitments/mitigation measures, criteria and goals should be achieved for the proposed project construction and maintenance.

24.6 SOCIOECONOMICS:

Mitigation Measures Prior to Construction:

- The City will relocate the families or businesses that would be impacted due to implementation of the proposed project or appropriate compensation would be provided to the property owners. The cost of carrying out this mitigation is part of the City's share of project costs and will be carried out in accordance with state and federal relocation requirements. If necessary, the City will work with the Santa Barbara Housing Authority to find affordable housing for owners of demolished residential units.

24.7 AESTHETICS/VISUAL RESOURCES:

Construction-Related Mitigation Measures:

- Aesthetic treatment, including the use of colored concrete and/or pouring concrete in forms that would mimic existing sandstone walls or natural vertical creek banks, shall be incorporated into project plans to minimize project-related impacts.

- Planting of vines shall be required along the creek banks to cover vertical walls.

- Bridges shall be designed to retain an appearance appropriate to the character of the neighborhood in which they are located.

- Vegetate stepped walls and create natural creek like environment (Alternative 6 only).

- Upgraded or improved fencing shall be provided along the banks and/or planting of vines along fencing.

- The final design for the above-stated mitigation measures shall be coordinated with a Design Subcommittee established by the City of Santa Barbara.

24.8 RECREATION:

Construction-Related Mitigation Measures:

- Plant native riparian vegetation which would allow increased opportunity for bird watching and provide maximum access to the residents for recreation use.

- Small pocket parks or areas that provide for limited passive recreation shall be created where real estate is available. (see figure 3.5.4 of the EIS/EIR for location of the habitat expansion zones).

24.9 HAZARDOUS TOXIC AND RADIOACTIVE WASTE (HTRW):

Construction-Related Mitigation Measures:

- Prior to construction, borings and soil samples shall be taken at potentially critical areas and analyzed at a qualified laboratory for likely contaminants. If concentrations are detected at or above action levels, remediation action shall be implemented in accordance with federal, state, and county procedures.

- Prior to commencement of excavation activities on the downstream side of the Haley Street Bridge, the USACOE or the selected construction contractor shall develop a shallow groundwater and soil sampling plan designed to detect the presence of petroleum hydrocarbons. The recommended sampling plan shall be implemented prior to commencement of excavation activities. If elevated levels of petroleum hydrocarbons are detected, the CRWQCB and County Department of Health and Human Services shall be consulted to help assess the situation and an appropriate regulatory response shall be developed and implemented to remediate the contamination.

- Construction equipment shall be kept in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work. The Corps shall develop and implement a spill prevention and remediation plan and workers shall be instructed as to its requirements. Construction supervisors and workers shall be instructed to be alert for indications of equipment-related contamination such as stains and odors. Construction supervisors and workers shall be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan if indications of equipment-related contamination are noted.

- Prior to commencement of excavation activities on the downstream side of the West Gutierrez Street Bridge, the Corps shall develop a shallow groundwater water and soil sampling plan designed to detect the presence of PCE and/or toxic byproducts of PCE degradation. The recommended sampling plan shall be implemented prior to commencement of excavation activities. If PCE or hazardous or toxic byproducts of PCE degradation are detected, the CCRWQCB and County department of Health Services shall be consulted to help assess the situation and an appropriate regulatory response will be developed and implemented to remediate the contamination.

- When the USACOE is prepared to commence excavation activities, samples of creek sediments shall be taken to the depth of planned excavation and the same suite of analyses used to characterize the shallow sediments will be used to analyze the deep sediments. In the event actionable concentrations of contaminants are detected by the analyses, the Corps shall develop a plan to identify the extent of contamination. A plan shall then be developed and implemented to comply with applicable laws and regulations related to the identified contamination so that excavation activities do not result in releases of HTRW to the environment.

- Prior to construction, borings and soil samples shall be taken at potentially critical areas and analyzed at a qualified laboratory for likely contaminants. If concentrations are detected at or above action levels, remediation action shall be implemented in accordance with federal, state, and county procedures.

24.10 **TRAFFIC**:

Construction-Related Mitigation Measures:

- Provide a traffic controller at each intersection where construction is performed.

- Provide detour signs for alternate routes.

- Limit the number and size of vehicles and reduce speed limits.

- Perform project construction in sections.

- Provide alternative bicycle routes.

- Identify location, time and duration of construction of each segment, bridge and installation of culverts.
- Notify residents and commercial owners of proposed construction in their area at least 15 days before initiation of construction in the vicinity of their neighborhood.

- Identify damage caused by construction vehicles and repair costs.

- Identify responsible agency or individuals to repair the damaged roads and assure that repair work is completed.

24.11 **SAFETY**:

Construction-Related Mitigation Measures:

- During construction, traffic control officers would be provided to divert traffic to minimize accidents.

- Long-term Impacts: Fencing or other type of the protection shall be provided for the public safety. Access points shall be provided to facilitate safe rescue.

- Install bars at end of the tunnel to restrict passage to people (applicable to oxbow bypass Alternative 8 only).

24.12 **UTILITIES**:

- Prior to relocation of utility lines, the property owners and tenants should be notified. Utility owners or the City of Santa Barbara would notify property owners affected by the relocation of utility lines.

24.13 **CULTURAL RESOURCES:**

Construction-Related Mitigation Measures:

- A qualified archaeological monitor will be in place during all ground disturbing activities, especially near archaeological sites CA-SBA-27 and SBA-28.

- If archaeological artifacts are discovered during project construction, construction would be halted until appropriate coordination and recording of the data is completed, and SHPO shall be consulted per 36 CFR Part 800.13(b), *Discoveries without prior planning.*

- Local ordinances require the presence of a Native American monitor that has traceable hereditary roots to the Barbareño Chumash. The National Historic Preservation Act has no such requirements for Native American monitoring. However, this will be stipulated as part of the construction agreements.

CEQA Mitigation for cultural resources:

CEQA requires the development of specific mitigation measures as part of the Environmental Impact Report. Each of the potentially affected structures are listed below.

116 Chapala Street, Chapala Street Pony Truss Bridge, Mission Creek Diversion
536 Bath Street, 134 Chapala Street, 15 West Mason Street, Potter Hotel Footbridge,
134 Chapala Street, 306 West Ortega Street, and 434 De la Vina Street.

Details for preferred, acceptable and partial mitigation are included in Section 18.3.4, Cultural Resources of the EIS/EIR. General mitigation measures include possible realignment of channel to avoid impacts to the significant structures, relocation of property and monitoring of the construction by the qualified archeologist. Final mitigation measures would be developed in consultation with the City.

SECTION 25 - DISTRIBUTION LIST

1.0 DISTRIBUTION OF THE FINAL EIS/EIR:

The following Federal, state, and local agencies; utility and private companies; interested groups; and individuals have received a copy of this document. Copies of the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) and technical appendices can also be reviewed at the Public Library and at the City of Santa Barbara Planning Division.

APPOINTED AND ELECTED OFFICIALS

Honorable Barbara Boxer, U.S. Senator
Honorable Dianne Fienstein, U.S. Senator
Honorable Lois Capps, U.S. Representative

SANTA BARBARA COUNTY BOARD OF SUPERVISORS

Honorable Naomi Schwartz, Chair
Honorable Joni Gray
Honorable Gail Marshall
Honorable Susan Rose
Honorable Tom Urbanski

SANTA BARBARA CITY COUNCIL

Harriet Miller, Mayor
Councilmember Mary Blum
Councilmember Harold P. "Rusty" Fairly
Councilmember Gilbert Garcia
Councilmember Gregg A. Hart
Councilmember Tom Roberts
Councilmember Dan B. Secord, M. D.

PLANNING COMMISSION

Harwood A. White, Jr., Chair
Brian Barnwell
Peter Ehlen
Grant House
Barbara Chen Lowenthal
Bill Mahan
Maurie McGuire

FEDERAL

Advisory Council on Historic Preservation
Department of Agriculture
    U.S. Forest Service
    Natural Resources Conservation Service
Department of Commerce
Department of Defense
    U.S. Army Corps of Engineers,
    South Pacific Division
    U.S. Army Corps of Engineers, Regulatory Branch
Department of Energy
Department of Health and Human Services
Department of the Interior
    Regional Environmental Office, Pacific Southwest Region
    U.S. Bureau of Indian Affairs
    U.S. Bureau of Land Management
    U.S. Bureau of Reclamation
    U.S. Fish and Wildlife Service
    U.S. Geological Survey
National Marine Fisheries Service
Office of Ocean & Coastal Resource Management
U.S. Council of Environmental Quality
USDA Natural Resources Conservation
Department of Transportation
    Federal Aviation Administration
    Federal Highway Administration, Office of Planning/Program Development
    Federal Railroad Administration
Environmental Protection Agency
    Region IX, Office of Federal Activities
Federal Emergency Management Agency
    Disaster Assistance Programs
    Federal Insurance Administration
Small Business Administration

STATE

Air Resources Board
California Resources Agency
California Water Commission
California Coastal Conservancy
California Integrated Waste Management Board
California Water Quality Control Board

Department of Boating and Waterways
Department of Conservation, Division of Mines and Geology
Department of Fish and Game
Department of Food and Agriculture
Department of Forestry and Fire Protection
Department of Health Services, Public Water Supply Branch
Department of Housing & Community Development
Department of Parks and Recreation
Department of Real Estate
Department of Transportation
Department of Water Resources
Governor's Office of Planning and Research
Office of Historic Preservation
Parks and Recreation Commission
Public Utilities Commission
State Clearinghouse
State Lands Commission
State Reclamation Board
Water Resources Control Board

COUNTY OF SANTA BARBARA/REGIONAL AGENCIES

County Administrative Officer
Public Works Director, County Engineer

CITY OF SANTA BARBARA

City Administrator
Community Development Director
Fire Department
Police Department
Public Works Director/City Engineer

UTILITIES AND TRANSPORTATION

Southern California Edison Co.
Union Pacific Railroad
Santa Barbara Metropolitan Transit District.

INTERESTED GROUPS

American Institute of Architecture - Santa Barbara Chapter
Architectural Board of Review

Historic Landmarks Commission
Mission Creek Consensus Group
Members of the Mission Creek Consensus Group
Audubon Society
California Historical Society
Santa Barbara Trust for Historic Preservation
Santa Barbara Chamber of Commerce
Sierra Club
Urban Creek Council

INDIVIDUALS:

A Notice of Availability of the Draft EIS/EIR was sent to all property owners located adjacent or within 450-feet of the project area. A Notice of Availability for the Final EIS/EIR will also be sent to the property owners in the same area. Copies of the Final EIS/EIR will be available at following public library.

LIBRARY:

Santa Barbara Central Library
40 East Anapamu Street
Santa Barbara, 93101
Phone: 805-962-7653
Hours: Monday thru Thursday - 10:00 am to 9:00 pm.
Friday and Saturday - 10:00 am to 5:30 pm.
Sunday - 1:00 pm to 5 pm.

1.1 FINAL DISTRIBUTION OF EIS/EIR:

The Final EIS/EIR will be distributed to agencies, organizations, and persons that submitted comments on the Draft EIS/EIR. A NOA will be published in the Federal Register to initiate public review of the Final EIS/EIR. A list of the agencies, organizations and persons, who provided written comments is provided below.

1. United States Environmental Protection Agency
2. United States Department of the Interior
3. United States Coast Guard
4. California Governor's Office of Planning and Research, Clearinghouse
5. City of Santa Barbara Historic Landmarks Commission
6. City of Santa Barbara Architectural Board of Review
7. City of Santa Barbara Parks and Recreation Department
8. City of Santa Barbara Parks and Recreation Commission
9. Justin Ruhge, Concerned Taxpayers of Santa Barbara County

10. Robert Bernstein, Santa Barbara Bicycle Coalition
11. Edward Cella, President, De la Guerra Homeowners Association
12. Darlene Chirman, President, and Kendy Radasky, Santa Barbara Audubon Society
13. Richard A. Stromme, Railroad Advocates
14. Louise Boucher, Citizens Planning Association of Santa Barbara County
15. Eddie Harris, Urban Creeks Council
16. Maria Gordon, Small Wilderness Area Preserves, Inc.
17. Brian Trautwein, Environmental Defense Center
18. Gabrielle and Jerome Boucher
19. Lisa Ann Kelly and Family
20. David Dates
21. Jerome and Gabrielle Boucher
22. Eva Inbar
23. Gail Pearce O' Brien
24. Dennis Hoey
25. Eduardo and Marite Gonzalez
26. Peter Gerlach
27. Antonio R. Romasanta, Harbor View Inn
28. Elihu M. Gevirtz
29. Lisa Torres
30. David Shelton and Alexandra C. Cole
31. Rita Gronhovd
32. Jana Zimmer
33. Kate Lundy
34. Teddy Gasser and Carlin Moyer
35. Charles I. Kline
36. Martin Landsfeld
37. J. D. Dale
38. John Poucher, Hollister and Brace, Attorneys at Law, for Jacques Partners
39. Francisco Zambelli

SECTION - 26 - LIST OF PREPARERS

The following individuals and contractors were primarily responsible for preparing this EIS/EIR.

Name	Discipline/Expertise	Experience/Qualification	Role in Preparing EIS/EIR
USACOE STAFF			
Joy Jaiswal	Geography/ Physical, Geomorphology, Urban, Medical and Cartography	11-years, Social Science Environmental Manager, Corps, 2-years, Instructor of Geography San Diego State University, 5-years, Instructor of Geography, University of Akron Ohio and Cuyahoga Community College, 14-years, Teaching Geography, M.S. University of Baroda; M..A M.S. University of Baroda; M.A. University of Akron, Ohio, Akron, Ohio	NEPA compliance; EIS Coordinator, compiling EIS/EIR together, analysis of environmental resources, except biology, HTRW, cultureal resources.
John Moeur	Biology; Zoology	5-years-Corps, Biological Science Environmental Manager; 12-years Teaching ecological and biological scientific analysis at university level; 20-years research-in ecology and biology; Ph.D. Zoology, University of Georgia, Athens, Georgia; M.A., Zoology, University of California, Davis, California; B.A. Biology, Claremont Men's College, Claremont, California.	Existing environmental conditions, and impact analysis on biological resources, HEP analysis, biological assessments.
Richard Perry	Archeology	10-years, Staff Archeologist, Corps, 9-years Archeologist with private consultants; B.A. Metropolitan State College of Denver, Denver Colorado (Major: Anthropology); M.A. course work completed, California State University, Los Angeles (Major: Anthropology)	Existing environmental conditions and effects on Cultural Resources
Priscilla Perry	Civil Engineering (HTRW and Air Quality)	13-Years, Civil Engineers, Corps	Existing Air Quality and air quality impact analysis.
Ed Demesa	Civil Engineering	3-years, Civil Engineer, Corps 5-years of Project Management, Air Force.	Formulation of Alternatives, Needs for the Project.

Ken Morris	Civil Engineer	8-years Project Management, 3-years Corps, Section Chief, Regional Planning Section. B.S. Civil Engineering, South Carolina State University; M.B.A. National University California.	Review EIS/EIR
Name	**Discipline/Expertise**	**Experience/Qualification**	**Role in Preparing EIS/EIR**
CITY OF SANTA BARBARA			
Janice Habbell, AICP.	Urban Planning Technology	23-years Urban and Regional Planning, Project Planner, Planning Division, City of Santa Barbara; B.S. Urban and Regional Planning,.	CEQA and City's Plan and Policy compliance for all environmental resources.
JONES & STOKES ASSOCIATES, INC.			
John Coy	Ecology	20 years experience as an environmental consultant; CEQA/NEPA, Air, Water and HTRW ; M.S. Ecology, U.C. Davis, Davis, California; B.A. Economics, U.C. Davis, Davis, California	Existing and impact analysis of water quality and HTRW resources. Sediment analysis.
POST/HAZELTINE ASSOCIATES			
Pamela Post	Architectural Historian	10-years in Architectural History; Ph.. D. Architectural History; M.S. Public History; B.A. Cultural Anthropology.	Architectural Resources Report for the Project Area.
Timothy Hazeltine	Cultural Resources	15-Years Cultural Resources Researcher; B.A. Cultural Anthropology.	Architectural Resources Report for the Project Area.
Dennis Moore Whelan, AICP	Architect and Planning	15-years in Architecture and Planning; M.A. Architecture	Architectural Resources Report for the Project Area..
Elizabeth Hammel	Cultural Resources	10-years as Researcher in Cultural Resources; M.A. Art History	Architectural Resources Report for the Project Area.

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APPENDIX - A

REVISED BIOLOGICAL ASSESSMENTS

LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

JUNE 2000

APPENDIX - A-1

REVISED BIOLOGICAL ASSESSMENT
TIDEWATER GOBY
LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

JUNE 2000

BIOLOGICAL ASSESSMENT
pertaining to

TIDEWATER GOBY (*Eucyclogobius newberryi*), LOWER MISSION CREEK FLOOD CONTROL PROJECT, SANTA BARBARA, CALIFORNIA

1 INTRODUCTION

The US Army Corps of Engineers (the Corps) prepared this revised Biological Assessment (BA) to comply with the Endangered Species Act of 1973, as amended (the Act). The Corps previously submitted in December 1999 a BA to the US Fish and Wildlife Service (FWS) with the Draft EIS/EIR for the proposed Lower Mission Creek flood control project in Santa Barbara, California.

Two Federally listed species, steelhead and tidewater goby, occur in Mission Creek. Two separate BAs have been written to identify project related impacts, implementation of environmental commitments to minimize or avoid impacts to these species, and implementation of compensatory mitigation for impacts which may nonetheless occur to these species because of this proposed action. This revised BA concerning potential adverse effects on tidewater gobies would be submitted to FWS, because that agency has authority to ensure this species would not be jeopardized by implementation of the project.

Subsequent to release of the Draft EIS/EIR design modifications of the project to avoid impacts to cultural resources became necessary. Structural changes in design would occur upstream of the estuary, beyond the waters which gobies would ordinarily inhabit. These modifications include: extension of the bypass culvert from 540 to 830 feet in length and a change in size and orientation of a weir to control the movement of water into the culvert. The Project Description attachment presents a thoroughly detailed project description. These changes led to recalculation of numerous hydraulic projections of the proposed project. These modifications do not alter the analysis of potential impacts to tidewater gobies as presented in the original BA which the Corps submitted in December 1999. The Corps coordinated extensively with your office staff and other involved resource agencies in development of the modified project design and hydrological analyses. This revised BA includes more detailed hydraulic evaluations of the proposed project. Those further analyses gave rise to additional mitigation features. The BA also incorporates those structural features to be built in the estuary to mitigate unavoidable project related impacts to the population of tidewater gobies in Mission Creek and to the aquatic habitat they depend upon.

1.1 Limiting Flood Damages on Lower Mission Creek

The US Congress originally authorized feasibility analyses of various alternatives to curtail Mission Creek's tendency to flood as a Water Resources Development Authorization in 1962. The plan which the Corps devised to accomplish that Congressional directive would reduce flood damages and partially redress historical deterioration of riparian habitat within the project's limits (Corps, 1999).

As proposed, the final portion of the existing stream channel, between Canon Perdido Street and Cabrillo Boulevard, would be widened to accommodate greater peak discharge, 3400 ft^3/sec, than this last section of Mission Creek presently conveys, about1050 ft^3/sec. In addition, an underground culvert designed to take on water in flows greater than 640 ft^3/sec would carry about ⅔ of the creek's conveyance past the narrowest place in the existing watercourse, a constriction in the so-called oxbow channel. Greater width of the streambed would come through excavation of existing stream banks. Except through the oxbow channel, it would have a natural bottom. It would be maintained regularly to preserve the operational characteristics of its design.

The streambed would be confined between vertical walls built in most places to half the height of the existing bank tops, on average between 3 and 6 feet. Those walls at the toe of the banks would constrain the currents, define the ordinary high water level somewhere up their sides, and form the load-bearing support to keep the upper part of the new banks in place. The banks exposed above the toe walls would be planted with native species of canopy and understory plants adapted to stream side habitat in southern coastal California. The Project Description enclosure, attached, presents all details of projection description.

1.2 Participants in Flood Control Project

The Corps is the lead Federal agency. Santa Barbara County Flood Control and Water Conservation District is the direct co-sponsor of the proposed action. In addition, an agreement was developed between the Flood Control District and the City of Santa Barbara. These two entities would share the non-Federal cost of the project.

1.3 Tidewater goby (*Eucyclogobius newberryi*) Girard, 1857 in Mission Creek

The estuarine conditions found in Mission Creek between Cabrillo Boulevard and Yanonali Street provide foraging habitat for tidewater gobies. The species was detected in the estuary in 1994 (Lafferty and Altstatt, 1995), specifically just upstream of the Mason Street bridge (Lafferty, 1998). Biologists from the FWS, National Marine Fisheries Service, and the Corps of Engineers searched diligently but found no tidewater gobies anywhere in Mission Creek during site visits in May, 1999. Likewise, visual scrutiny of parts of the estuary during a low tide in early May 2000 turned up no sightings of tidewater gobies.

Tidal fluctuations influence the extent upstream of estuarine conditions. Brackish water has, at times, reached only as far upstream as Mason Street while at other times gone nearly to the Yanonali Street bridge. An artificial sill shaped from poured concrete and about eighteen inches high spans the entire width of Mission Creek at that latter bridge. Under normal tidal influences and stream currents, this man made barrier probably constrains estuary water from going above Yanonali Street and thereby usually marks the upstream limit of possible habitat for tidewater gobies.

The historic man-made diversion channel between Yanonali Street and Highway 101 has a lining of hewn and mortared sandstone blocks and has a concrete bottom, somewhat fragmented. It affords virtually no cover of any kind. This segment of Mission Creek's channel, roughly 530

linear feet of the existing water course, would seem a biological desert sufficient to deter gobies from ever trying to swim farther upstream. However, gobies do swim considerable distances upstream in other drainage systems, prompting the designation of critical habitat as far upstream as 1.3 km (0.9 mi) at San Mateo Creek and 5 km (3.1 mi) up the Santa Margarita River in San Diego County (U.S. Fish and Wildlife Service, 1999b). Most likely, the species ranges in Mission Creek only between the coastal lagoon (where Mission Creek reaches the ocean south of Cabrillo Boulevard) and Yanonali Street.

Seasonal presence of this lagoon probably depends on a rough balance between runoff of fresh water coming down Mission Creek, in the winter and spring by and large, and the summertime deposition by long-shore transport currents and local wave action of a sandbar which blocks the mouth of Mission Creek. Tidewater gobies spawn in such lagoons, where proper conditions of salinity, water temperature, and coarse sandy bottoms persist from spring or early summer through the onset of winter rains (Swift, *et al.*, 1989). Males establish small breeding territories, scoop out small depressions, then wait for females lay eggs in the depressions. Males may guard eggs and young fry from several females.

Tidewater gobies have an annual life cycle. Numerous recent experimental studies (U. S. Fish and Wildlife Service, 1999a) paint a combined picture of a species classically described as being "r-selected", i.e. one whose ability to disperse to unoccupied habitat, inherited tolerance of broad and sometimes variable ecological conditions of that habitat, and whose reproductive traits allow it to populate any suitable site in a very short time make the species' overall reproductive behavior approach nearly the maximum rate of which it is capable. The "r" refers to that tendency to turn out many young quite quickly in accordance with the intrinsic rate of reproduction characteristic of that species in these environments.

Tidewater gobies seemingly will eat whatever is available that is of about the right size, including small assorted crustaceans, the aquatic larvae of many insects, and snails (Irwin and Soltz, 1984; Swift, *et al.*, 1989). The species has evolved in transient coastal environments which favored the physiological ability to convert those nutrients into large numbers of young. Such species are also prone to sudden disappearances of local populations. Over time, they usually exhibit a pattern of very high numbers for a few generations, then dramatic crashes of numbers. Often dispersal from nearby populations brings new groups of genes into a local population, which may stimulate a quick resurgence of numbers. This general pattern may lie behind the seemingly low numbers of tidewater gobies in the Mission Creek system over the last decade.

1.4 Critical Habitat for Gobies

Critical habitat for tidewater gobies has been designated (U.S. Fish and Wildlife Service, 1999b). All the watersheds included in that decision occur to the south of Aliso Creek, in Orange County. Mission Creek does not provide habitat critical to the continued existence of tidewater gobies.

2 Interagency Consultation

Section 7(a)(3) of the Act requires active consultation between the lead Federal agency and FWS in any circumstance in which the lead agency concludes that its proposed action could affect an endangered or a threatened species. Direct effects and indirect effects must both be evaluated. In December 1999, the Corps initiated formal Section 7 Consultation. During preparation of the

Draft EIS/EIR extensive coordination occurred between Corps and FWS staff including reciprocal exchanges of information, discussions of habitat requirements, techniques of field observation, schemes to minimize influences on species while still accomplishing the stated purpose of the proposed project, cooperative site visits, exchanges of written ideas and information, fulfillment of requirements under other pertinent laws, and so forth. The Corps and FWS have been engaged in such a dialogue since December 1997. Biologists from both agencies have together walked the entire length of the proposed flood control project to evaluate streambed conditions, general habitat of creek and banks, and importance of the lower reaches of Mission Creek as potential spawning or nursery habitat.

The Act requires formal consultation when the agencies determine that a proposed action "may affect" a species listed under and protected by the Act or habitat critical to the species' continued survival. The lead agency initiates formal Section 7 Consultation with a written request, which includes a Biological Assessment, to FWS [Section 7(a)(2) of the Act] and concludes when FWS issues a written Biological Opinion [Section 7(a)(3) of the Act].

The Corps submitted a Draft Biological Assessment to FWS in December 1999. Since then, refinements of hydraulic calculations, sediment budgets, and design features have been under way. Those various supplements are included as separate enclosures which accompany this revised BA. The first of them is the complete and detailed Project Description. The second is the Final Hydraulics Documentation (Hydraulics appendix). The third enclosure consists of Preliminary Design Plans. The fourth enclosure is an independent analysis of shading patterns predicted from the arrangement of trees and shrubs to be planted as part of the project (the Shading appendix). The fifth and final enclosure is the Mitigation Monitoring Plan. This Mitigation and Monitoring Plan would include recommendations by your office, and then incorporated as Appendix H of the Final EIS/EIR.

Based on this revised analysis and the conclusion by the Corps that construction of the proposed flood control channel along lower Mission Creek may affect tidewater gobies in the estuary and the coastal lagoon downstream of it, the Corps re-initiates formal Section 7 Consultation with the US Fish and Wildlife Service.

3 EXISTING CONDITIONS

Estuarine and riverine aquatic conditions occur within the area of the project and both portions of the creek have extensive urban influences. The proposed flood control project would necessitate construction in both portions.

The descriptions which follow treat the goby population of Mission Creek as resident just within the estuary, but recognizes that estuary itself as the final portion of the creek's aquatic habitat. As such, various activities upstream might conceivably influence tidewater gobies, at least indirectly. For that reason this section needs to be the prelude to understand how the various changes (described in Chapter 5, below) which would occur upstream of the estuary — changes of the streambed, sedimentary regime, and subsequent requirements for streambed maintenance — would affect that aquatic habitat, and finally how changes to the existing vegetation on the creek's banks would directly improve water conditions upstream of the estuary and ought to have indirect beneficial effects within the estuary. Overall and after maturation of native plants to be included, the proposed flood control project would have greater biological values when compared to the expectations of future conditions in the absence of this project.

3.1 THE ESTUARY'S STREAM CHANNEL AND BANKS

As best Lower Mission Creek may be characterized, its aquatic habitat equates, roughly, to prevailing conditions below the ordinary high water mark, which over the actual length of the streambed included within this project (5380 linear feet) passes from fresh water at its upper end to saline at the lower end. Fresh water in character from Canon Perdido Street to Yanonali Street, 4320 linear feet (approximately 80% of the project length), Mission Creek is just barely a perennial stream however. Indeed, urban runoff alone may prevent the disappearance of surface water after late summer. Estuarine traits prevail from Yanonali Street to Cabrillo Boulevard (about 20% of the project length), becoming more pronounced since the daily interchange of fresh and salt water is greater closer to Cabrillo Boulevard. Commercial and residential development which took place historically along this last section of creek now constrain it within a nearly artificial channel:

- no mudflats dissected by tidal creeks remain anywhere along the estuary;
- no tracheophyte plant species ecologically associated with functional coastal marine communities remain anywhere along Mission Creek;
- except for a short gap in man-made revetments fashioned around a large sycamore tree immediately below the Mason Street bridge, no natural bank or vegetation exists between Yanonali Street and State Street on the right-hand side of the creek (looking downstream), about 1060 linear feet;
- Where natural bank exists on the left hand side (two unconnected lengths of bank without revetment and about 320 linear feet long in total) no native trees or shrubs of any kind remain. A band of pampas grass (*Cortaderia jubata*) upstream from the State Street bridge makes up nearly 175 linear feet of that total.

Gobies which reside in the creek have direct passage back and forth between the lagoon and estuary by way of the bridge at Cabrillo Boulevard. The existing banks between Cabrillo Boulevard and the State Street bridge (50 linear feet on the right hand side, about 150 linear feet on the left) are lined by shrubby ornamentals (*Myoporum* cf. *insulare)* which overhang the edges of creek somewhat. These shrubs shade the water along the sides of the channel and probably afford gobies and other small fish some shelter. However, they also afford splendid perches just above the water for two bird species, both predators of small fish — green-backed and black-crowned night herons (*Butorides striatus* and *Nycticorax nycticorax*, respectively) — which have been seen there repeatedly awaiting their chances for a quick meal. A cluster of sycamores (a one individual with multiple trunks) just below the Mason Street bridge shades a length of perhaps 70 feet of the creek. Three bridges, Cabrillo Boulevard, State Street, and Mason Street, undoubtedly provide sheltered areas of water which gobies would seek out at times.

Estuary Conditions: Saline water from the ocean mixes with fresh water at the lowest end of Mission Creek, at variable locations between State and Yanonali Streets. Its length varies seasonally as judged by the upper limit at the moment where clumps of the filamentous green alga (*Enteromorpha* sp.) float about, the simultaneous partial stratification and mixing between saline and fresh water layers can be seen, and indicated by the presence of topsmelt, sculpins, and other species intolerant of fresh water. In September 1997, for example, estuarine properties became evident ⅔ the way between Yanonali and Mason Streets. In December 1998, fresh water began to mix with salt about 30 feet downstream of Mason Street. During the rainy season, runoff of large storms evidently pushes salt water as far down the channel as Cabrillo Boulevard (Fig. 1).

Measurements of relevant water chemistry properties reveal this seasonal influence. The City of Santa Barbara engaged a private contractor to sample water in Mission Creek at two locations on a weekly schedule beginning in late November 1994 and continuing through October 1995. Sampling locations are about 65 yards apart. Samples came from the upstream side of the

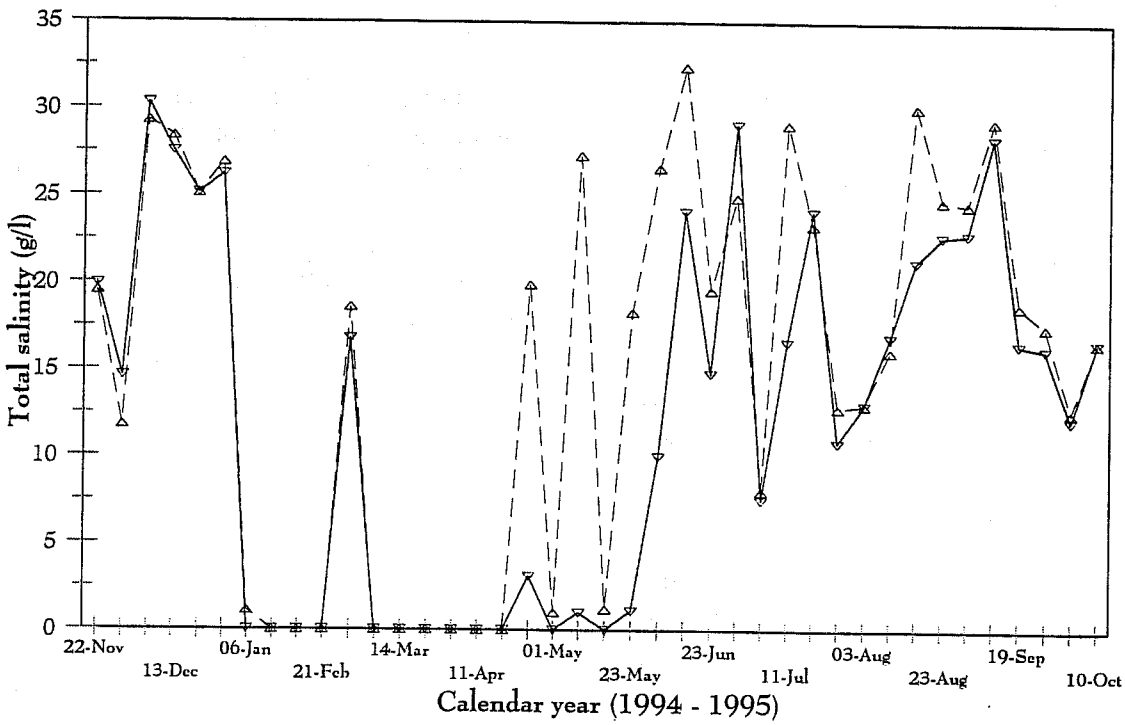


Fig. 1. Salinity (measured in grams per liter, g/l) at two sampling locations the Mission Creek estuary. Measurements shown by the dashed line came from the upstream side of the Cabrillo Boulevard Bridge; those shown as a solid line were taken on the upstream side of State Street Bridge. Despite a few dates when salinity differs between the two sample locations, the differences between them overall are not significant, $p(F_{1,76} = 1.501) = 0.22$.

Cabrillo Boulevard bridge, and those from farther up the estuary came from the upstream side of the State Street bridge (City of Santa Barbara, 1995). No details of sampling techniques are available.

Water in the open ocean off Santa Barbara would have a total salinity approximately 35 grams per liter (g/l). Water in this lower part of the estuary is somewhat diluted in the summer months, approximately 20 g/l, and may be virtually free of salt during times in the wet season (Fig. 1). Peak salinities (approximately 30 g/l) occurred between mid-June and early January that year, when the minimal amount of water flows from the Mission Creek watershed. During the winter months, steady runoff sweeps saline water out of the lagoon and salinities were below the sensitivity, less than 1g/l, of the measuring instrument (a refractometer). Note an anomalously high spike of saline water (18 g/l) about the 1st of March 1995.

Salt concentrations recorded during this calendar year exhibit the range and seasonal proclivities tidewater gobies are known to inhabit (US Fish and Wildlife, 1999b).

Overall, the estuarine water just before Mission Creek opens into the lagoon contains rather little suspended sediment, as measured by total turbidity of the water column (Fig. 2). With the exception of two sharp increases of turbidity caused by heavy run off, the first in mid-January and the second in mid-May of 1995, turbidity ranges from levels less than 1 NTU to about 10 NTU.

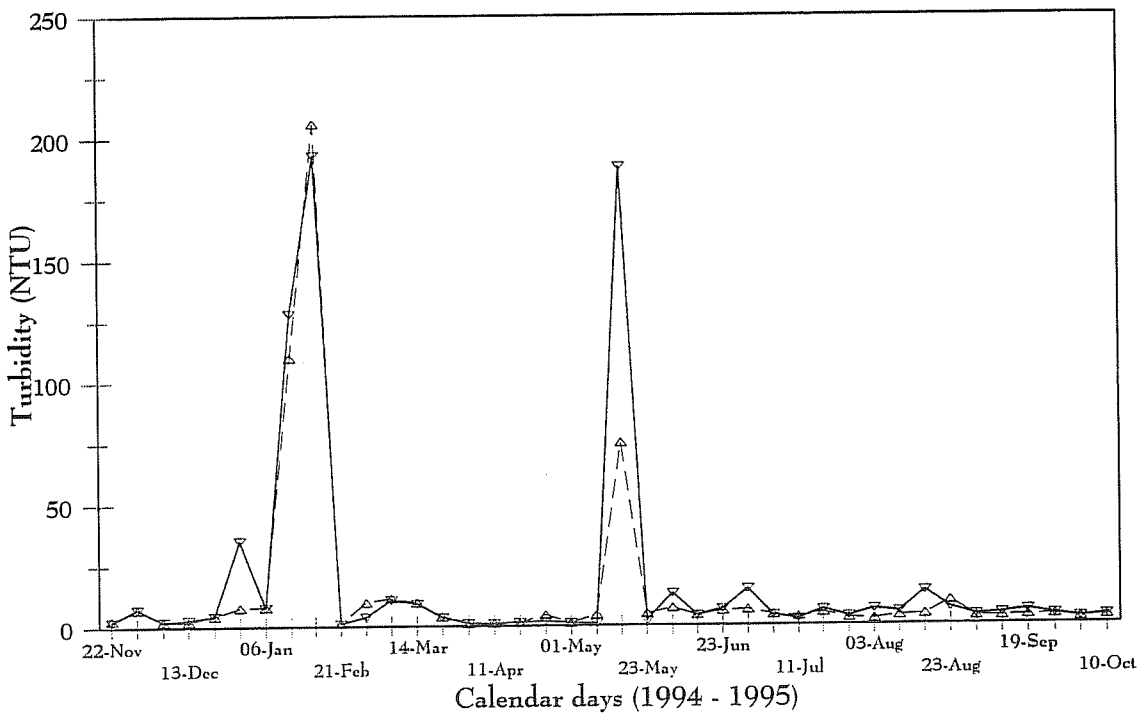


Fig. 2. Total turbidity (measured in nephelometric turbidity units, NTUs) at two sites in the Mission Creek estuary. Lines and symbols follow the convention of Fig.1.

While not a measurement which most people commonly encounter, nephelometric turbidity units (NTUs) provide a quantitative measure of light scattering by all the solids suspended in a water sample: e.g., a glass of water measured as about 15 NTU looks faintly cloudy to the eye.

Sediments contributing to turbidity of Mission Creek would seem to originate from rather different sources in a manner also linked to climatic seasonality. The meager and non-continuous flow down Mission Creek seen in September 1997 would be incapable of transporting sediments a significant distance along the channel. Urban runoff from streets that enter via storm drains under bridges, particularly at Mason Street, could add somewhat to turbidity farther downstream, but most of the opacity of water in the estuary is probably due to roiling of the water caused by daily tidal fluctuations. The rise in stream volume and velocity coinciding with the onset of winter rains would carry sediments through the estuary and out into the lagoon, and could reasonably account for the fluctuations seen between December and May of 1995 in Fig. 2.

3.2 Aquatic Habitat Upstream from the Estuary

A sequence of man-made structures form a substantial portion of the existing watercourse through which steelhead have to pass. This section probably follows the naturally incised channel although that is not now evident. Mission Creek first bends to the right just above Highway 101, creating a feature known locally as the oxbow. In very quick succession thereafter, the oxbow leads water beneath the freeway (a box culvert bridge 140 feet wide), through a 60 foot length lined by riprap and wing walls, beneath Montecito Street (also a box culvert bridge, 60 feet wide), through a 20 foot section lined again by wing walls, beneath the bridge which elevates the railroad tracks (a central pillar bridge 70 feet wide), and then bends back to the left at the upper end of the historic sandstone-lined channel. The sandstone channel has a concrete bottom and carries water as far as the bridge at Yanonali Street (about 530 in length). The transition from fresh to brackish water effectively begins directly beneath the Yanonali bridge where a sill roughly 15 inches high spans the full width of the creek bed (entirely concrete at that point) and marks the upper limit of tidal influence, except perhaps during very severe winter storms.

In both the fresh-water and the estuarine segments its aquatic properties have been influenced to a very great degree by individual property owner's decisions to armor streambanks on their property, the toe of those banks, and even the creek bed itself in many locations against erosion. Where concrete was placed below the ordinary high water mark, the result can be a solid projection into the low flow path of the creek in some places, a uniformly broad, flat surface (e.g. upstream of the Gutierrez Street Bridge), or concrete edges that confine the creek's low flow route to a narrow course. Estimates of the length of the streambed where only natural surfaces are evident (admitting the probable existence of some concrete now covered thoroughly by native sediments) were made by walking the creek. Natural sediments (silty muds and gravels) compose the streambed for about ⅔ of its length within the project area (3560/5380 = 0.66), while hardened surfaces cover roughly ⅓ the length of the stream bed (1820/5380 = 0.33).

The County Flood Control presently cleans the fresh-water portions of the creek as needed to remove accumulated sediments, obstructive growth of plants, and accumulated debris. Sporadic accumulation which diminishes its conveyance capacity by more than 15% triggers that need for maintenance. That maintenance procedure has stripped the creek bed of most natural features that would have contributed to a heterogeneous stream channel. In fact, virtually all pools in this reach of Mission Creek have formed where complex hydraulic interactions between man-made structures and currents caused differential erosion and deposition of sediments. They are also transient for that very reason, and therefore tend to change in size from one season to the next. Those at bridge abutments are largest, e.g. estimated as 5 feet deep, 15 feet wide, and 40 feet long. Two such pools existed in May 1999. Concrete ledges poured by private owners have also created pools where currents undercut them. The longest seen in May 1999 was estimated as 25 feet in length and possible 4 feet deep. The smallest such ledge pool was about 7 feet in length and perhaps a foot deep. Four undercut concrete sills of this nature were identified in May 1999. Two natural pools have formed amid rocks and concrete rubble in the oxbow. Each was approximately 10 feet long, 1½ feet deep and as wide as the channel. While these isolated pools were evident in May 1999, on the whole Mission Creek lacks any substantive areas of runs, riffles, pools, turbulent waters and eddies.

3.3 Stream Bank Vegetation

Construction of walls, an essential component of the project's design and without which the footprint of direct impacts would have to be twice as large to achieve the same conveyance, would require removal of most extant vegetation along 78% of the lower reach of Mission Creek, about

8420 linear feet (counting both the right and left banks). The remaining 22% of its existing banks, about 2340 linear feet (on both sides of the channel) between Highway 101 and the downstream side of Yanonali Street, are entirely bare of plant growth.

In those areas to be disturbed by stream bank construction, the presence of hardened bank surfaces currently exerts a strong effect on the abundance and vigor of plants along the creek. A soft bank occurs along 1940 linear feet of stream bank (counting both sides), while 6,480 linear feet (measured on both sides) have been armored by some means or other. In essence, hardened surfaces line about 77% of the creek's banks, aside from that stretch between the freeway and the upper most end of the estuary. Section 10 of the EIS/EIR provides details on existing vegetaion within the project reach. Maintenance, monitoring goals, success criteria for native plants to be included in the project's design, and so forth are identified in the Mitigation Monitoring Plan.

These revetments, of quite diverse materials and thoroughness, are not uniformly solid and impenetrable by plant roots. However, plants native to a stream side habitat in southern California are few and far between. Save for large and venerable western sycamores (*Platanus racemosa*) at six locations along the creek, it retains almost none of the stratification of canopy and understory species it must have had a century and more ago. Widely scattered arroyo willows (*Salix lasiolepis*) and white alders (*Alnus rhombifolia*) growing even more sparsely hint of what was once there below its riparian canopy, but nothing more than hint. Invasive non-native species compose virtually the entire plant assemblage along the creek. Now, giant reed (*Arundo donax*) forms the most conspicuous element of stream bank vegetation, and probably would rank highest in biomass of anything growing along the creek.

4 POTENTIAL EFFECTS TO TIDEWATER GOBY

4.1 Locus of Project along Lower Mission Creek

The proposed flood control construction along Mission Creek would extend from Cabrillo Boulevard at the downstream limit to the intersection of Castillo and Canon Perdido Streets at the upstream end of the project (Fig. 3). It would entail:

- mechanical excavation and expansion of the streambed (except through the oxbow channel),
- construction of vertical walls of varying heights,
- construction of a culvert to create an alternative flow which bypasses the oxbow at discharges greater than 640 ft^3/sec,
- fabrication of several structural mitigation features,
- planting native trees and shrubs along reshaped bank and at select locations adjacent to the banks.

Although disturbance to the creek bed and its banks would occur throughout the length of the project, since tidewater gobies are unlikely ever to be above Yanonali Street direct effects from construction activities should be confined downstream from there.

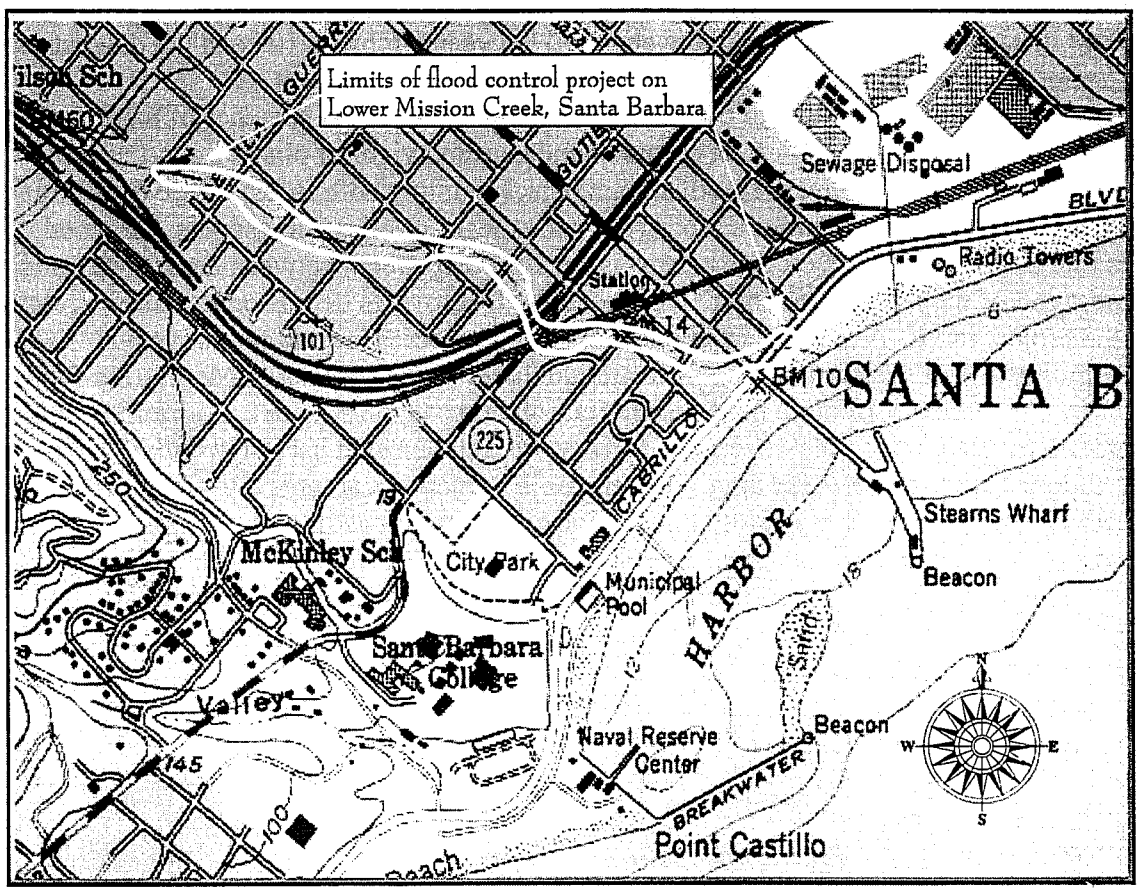


Fig. 3. Proposed flood control project would extend from Cabrillo Boulevard, at the lower end of Mission Creek, to Canon Perdido Street at the upper end. Excerpt from 7½ ′ USGS map, Santa Barbara Quadrangle.

Full descriptions of the project's design along each section of the creek may be found as an attachment, Project Description. The effects of specific components of the design which pertain directly to ecological requirements of steelhead are described in Chapter 5, which follows.

4.2 Flood Control Construction and Future Maintenance May Affect Gobies

Construction between Cabrillo Boulevard and Yanonali Street. The most likely potential cause of adverse effects to tidewater gobies will lie in the necessity to build a temporary construction exclosure to dry the streambed and toe of banks prior to mechanical excavation. The scheme for flood control construction and its tentative scheduling would minimize this effect during the prime goby reproductive season through a combination of timing the work, on-site monitoring for and supervised relocation of fish, and means to de-water only half the creek at any one time. Nonetheless, netting and moving gobies in an approved manner would affect them temporarily and possibly adversely. Please refer to the Mitigation Monitoring Plan for a summary of project related mitigation and monitoring.

Release of tidewater gobies and other animals taken in seines from the drying exclosure into a suitable area, presumably of Mission Creek, may mean dumping assorted species together in quite unnatural densities and groupings of species. Until these refugees have dispersed, an unwitting interspecific melee could lead to gobies being confused and then eaten in numbers higher than typical.

Even after the water exclosure has been erected to dry half the creek, gobies would still have access to unrestricted water in the other half of the channel. However, it is conceivable that mechanical vibration originating from earthmoving equipment operating in the dry side of the exclosure could be transmitted through the ground and water. Such vibrations could be sufficiently irritating, or perhaps just sufficiently novel, as to dissuade gobies from swimming upstream past the construction area into higher reaches of the estuary, as they might be accustomed to do. Construction activities in the estuary could restrict their foraging to an area downstream of the vibration and potentially smaller in size than would otherwise be the case. That such a disruption of normal behavior may occur seems plausible. Should this happen, it would constitute an adverse effect on the population, although one of temporary duration.

Construction on the banks would remove what little vegetation now grows along the estuary. To the extent that plant growth provides important sources of food, e.g. aquatic insect larvae which themselves depend on nutrients washing into the estuary, removal of these plants could, perhaps, have a direct effect on nutrition of gobies within the estuary.

Removal of existing shrubs between State Street and Cabrillo Boulevard may alter their microhabitat and behavior of gobies in this region of the creek. A change of this nature may be construed as having an adverse effect on gobies. The effect would also be temporary.

Design plans would leave the creek's channel wide than it is currently and confined between concrete walls whose surfaces are smoother than the existing spectrum of revetments. These structural changes could induce changes to flowing water, especially in the boundary layer where tidewater gobies might swim preferentially. Such potential changes in lotic characteristics of the creek could affect tidewater gobies adversely.

Construction between the oxbow and Canon Perdido Street. As construction during the second year of the project (**Project Description attachment**) resumes upstream of the oxbow and then shifts steadily upstream from there, silt curtains will be deployed below the immediate area of construction to reduce suspended sediments in the water. In all likelihood, these fences probably will not trap all sediments and some will be carried downstream to the estuary. Although the distance over which untrapped sediments would have to travel and probably settle out (a minimum of about 1200 feet between the oxbow and Yanonali Street) before ever reaching the estuary, if concentrations are still high gobies there could have some impairment of respiration. This potential

adverse effect should wane as mechanized work advances steadily upstream from the oxbow toward the project's upper limit.

Secondarily, silt fences may also trap potential food items that would otherwise wash downstream and become part of tidewater gobies' diet. A change in movement of organic detritus, also potentially attributable to silt fences located farther upstream, could starve insect larvae or snails which gobies normally feed on, thereby indirectly affecting tidewater gobies. Disruption of the food web in the estuary due to construction upstream which alters the movement of sediment and organic debris downstream may constitute an indirect effect to tidewater gobies in Mission Creek.

Routine channel maintenance. Once finished, the project will require annual maintenance to maintain design channel conveyance (**Project Description attachment**). Historically, fine sediments have never accumulated in the estuary to a depth which necessitates they be removed. Larger runoffs during the winter months effectively remove all the silty deposits which settle there during the summer and fall. Sediment budgets should not change appreciably with the project (Chapter 5, below). As a result, no impact to tidewater gobies is anticipated from periodic maintenance procedures.

5 Hydraulic Considerations on Conditions in the Estuary

The proposed designs to accommodate runoff equal to 3400 ft^3/sec through this region of Mission Creek necessitate structural changes of the creek bed and its banks. In turn, these will bring about hydraulic changes when compared to existing conditions. The effects of structural changes — wider streambed, soft bottom of the streambed upstream from Highway 101 and downstream of Yanonali Street, a uniform gradient of that streambed, lower water velocity at any given discharge, a shift of sedimentary deposition upstream from where bedloads now tend to settle, walls to confine the creek channel and keep the banks in place, and a culvert to bypass the oxbow channel — have been analyzed with appropriate numerical models. Results of those models constitute the second attachment to this BA. Interpretations of those results appear below in regard to microhabitat requirements of gobies, typically as representative cross-sectional evaluations. However, these interpretations are not meant to substitute for those numerical results and the reader's attention is directed to that attachment for any and all relevant hydraulic information.

5.2 **Wider Creek and Channel**. Greater capacity of the streambed would come, in part, through lateral expansion by excavation of existing stream banks. Expansion of the creek's width would not be uniform throughout its length. Instead, different segments would widened different amounts:

Table 2. Larger streambed as a result of flood control design						
segments bounded by streets	existing creek bed width (average)		planned creek bed width		% increase	
	feet	acreage	feet	acreage	feet	acreage
Canon Perdido to Haley Streets:	25 feet	1.22 acres	43 feet	2.10 acres	75% wider	72% larger
Haley to Gutierrez Streets:	25 feet	0.39 acres	50 feet	0.78 acres	100 % wider	100% larger
Yanonali Street to Cabrillo Boulevard:	27 feet	0.69 acres	60 feet	1.54 acres	71% wider	220% larger
streambed habitat		**2.30 acres**		**4.42 acres**		**92% larger**
net change				**2.12 acres**		

5.3 Natural Bottom.

At present, concrete has been placed on the bottom or along the sides of the creek over at least 33% (1820 linear feet) of the streambed, or as estimated by existing streambed area, on about 20% of that (*ca.* 0.52 acres/2.3 acres = 0.2). Estimates are conservative because more could well be present but unseen because sediments cover it.

All existing hardened bottom would be removed and replaced by native sediments throughout except within the historic sandstone channel and beneath bridges already built as box culverts. In total, approximately 4450 linear feet of streambed would be surfaced with native sediments. Incorporating the three distinct widths of the final design — 43, 50, and 60 feet — the proposed design would yield approximately 4.4 acres streambed, and all this would be without any hardened surfaces, just soft, native sediments. This would amount to an increase of nearly 2⅛ acres over the current size.

The native sediments which underlay Mission Creek would become the actual stream bed after all existing hardened surfaces have been removed. Subsequent aggradation of materials derived from the Santa Ynez Mountains, primarily cobbles and coarse gravels, would restore the bottom's native irregular and varied texture. Together with finer sediments lodged among them, invertebrates and herbaceous plants would benefit incidentally.

5.4 Longitudinal Streambed Profile

The streambed will have a constant pitch when completed, particularly at bridges. No discontinuities in the slope of the creek's channel will occur anywhere within the project, nor at the transition to the trapezoidal section of Mission Creek upstream from Canon Perdido (see Hydraulics attachment). In consequence of this design feature, steelhead will not confront drop structures of any kind from either direction.

5.5 CURRENT VELOCITY

The existing stream channel has considerable topographic variability in addition to being rather narrow on average. The lateral expansion coupled with restoration of soft bottom throughout would have the overall effect of slowing the water at any given discharge. Calculations from appropriate numerical models of the stream channel **(Hydraulics appendix, HEC-RAS output)** were made at 50 foot intervals of measured stations. Among those, seven representative cross-sections have been selected to represent the general pattern. These seven happen also to be the cross-sections for which sediment deposition budgets were calculated, as well. By location, they are shown in Fig. 4.

Table 3. Water velocities as calculated (HEC-RAS model) for seven representative stream cross-sections.

	Velocity (ft/sec) of Mission Creek when conveying 640 ft^3/sec	
representative cross section	existing channel	proposed wider channel
11	4.55	6.88
10	8.14	6.17
9	5.15	3.42
8	10.22	4.68
7	5.57	4.38
6	9.37	4.38
4	1.92	3.89

At two cross-sections, one of them in the estuary (#4), stream velocity is expected to rise compared to existing patterns. Water velocity in the center of the channel would double from about 2 to about 4 feet per sec, according to these calculations. At five of them, stream velocities are projected to be lower than the current conditions.

On average, stream velocity at a discharge equal to 640 ft^3/sec would by 95% of the current conditions.

5.6 SEDIMENT BUDGET

Stream flow data recorded through the period of record (at USGS stream gage station Nº 11119750 on Mission Creek near Mission Street, approximately 1½ miles upstream of the top of the project) were analyzed by appropriate statistical techniques (HEC-1 Flood Hydrograph Package, see Hydraulics attachment) to give valid and comparable models of peak and average daily flows. Such numerical models, called balanced hydrographs, then were applied in conjunction with the specific hydrograph of the record flood (that of January 10, 1995 when peak

discharge reached 5200 ft^3/sec and the 24 hour average discharge was 1400 ft^3/sec) to calculate projected movement of sediments.

Each calculation (Table 4) pertains to a single storm event, even though the present and future needs to remove sediments arise from net aggradation from the sporadic patterns of individual storms over a period of time. Projections for sediment movement at seven representative cross-sections (Fig. 4) have been derived at three representative levels of discharge. In a harsh year, the sediments from many storms could trigger repeated maintenance cycles within certain reaches of the creek. On the other hand, several mild winter seasons may come and go without need for any maintenance of the streambed.

Table 4. Anticipated pattern of sediment deposition or erosion at seven cross sections on Lower Mission Creek. Results come from numeric modeling of sediments budgets based on balanced, synthetic hydrographs for each of three flow conditions. All results are in units of cubic yards (yd^3) and represent the expectation of sediment movement arising from a single storm event whose peak conveyance corresponds to either the yearly average event for Mission Creek (640 ft^3/sec), a storm event that occurs on average once every 5 years (1470 ft^3/sec), or a storm event that occurs on average once every 20 years (3400 ft^3/sec). Columns headed 'current' and 'designed' show sediment patterns for the existing conditions and the proposed flood control project, respectively. The columns headed 'difference' show how sediment patterns would change as a result of the project.

Cross section	net effect	640 ft^3/sec discharge			1470 ft^3/sec discharge			3400 ft^3/sec discharge		
		current	designed	difference	current	designed	difference	current	designed	difference
# 11	erosion	-333	-1850	**-1517**	-939	-5081	**-4142**	-2683	-14155	**-11471**
# 10	deposition	-820	1348	**2168**	-2075	3691	**5767**	-5305	10251	**15555**
# 9	erosion	252	-297	**-549**	599	-1384	**-1983**	1425	-5862	**-7287**
# 8	deposition	383	483	**100**	1061	1892	**831**	2973	7268	**4294**
# 7	deposition	-1181	185	**1365**	-3237	513	**3750**	-8991	1444	**10434**
# 6	erosion	592	-56	**-648**	1624	-111	**-1736**	4518	-198	**-4715**
# 4	erosion	581	-313	**-895**	1594	-928	**-2522**	4422	-2773	**-7196**
net difference				**25 yd^3**			**-35 yd^3**			**-385 yd^3**

Sedimentary regimes are predicted to change most at cross-sections 10 and 7. In both locations, the current erosive pattern would shift to one of net deposition. The opposite kind of change, from a current depositional pattern to one of net erosion during a storm event, would characterize three cross-sections. For example, storm events would be expected to remove silts and fine sediments from the estuarine section of the creek, cross-section 4. A similar change to net erosion would occur at cross-sections 9 and 6, both upstream of Highway 101.

To the extent cross-section 4, an arbitrarily chosen location, typifies the changes expected throughout the estuary construction of the project would reduce the bedload of fine sediments carried in. The substrate in the estuary may come to have a more gravelly and rocky texture

throughout on a permanent basis. If so, tidewater gobies may actually have an expanded spawning area as a result.

The change from existing conditions to design conveyance capacity would alter the net sediment budget for the entire project very slightly. A net total of 25 yd^3 should accumulate each time the creek carries an average storm event. In contrast, individual higher peak flows should promote net erosion from the streambed, 35 yd^3 during a 5-year storm event and roughly ten times that quantity removed during a single design event.

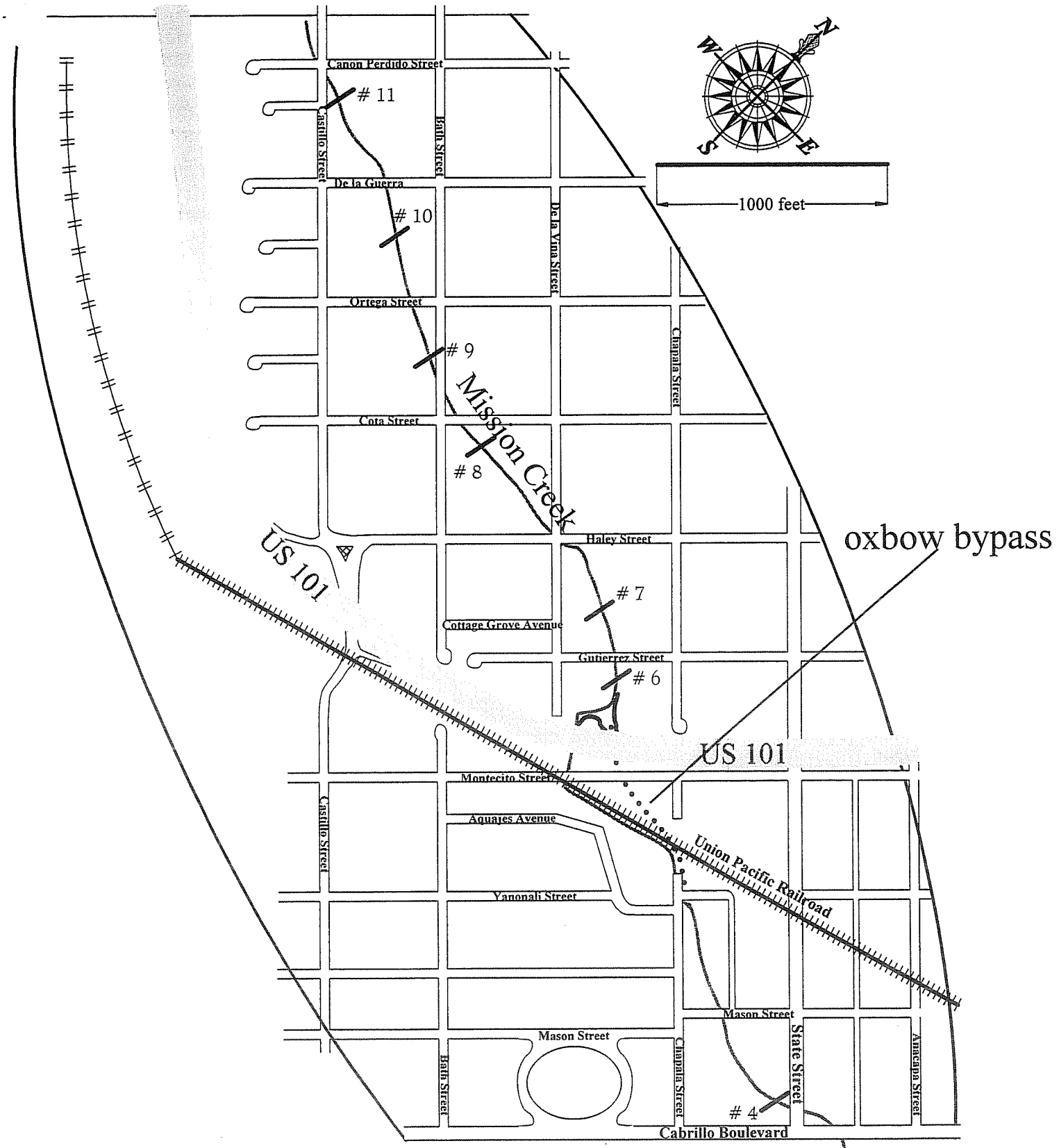


Fig. 4 Location of representative cross-sections

5.7 Toe-Walls and Banks Stabilized by Ungrouted Riprap and Planted with Native Species

Bank stabilization upstream of Highway 101 would rely primarily on slopes armored by riprap. Cylindrical planters placed through the riprap would admit canopy and understory species. The final surface would be hydro-seeded with an appropriate mixture of annual and perennial native grasses. In total, about 3900 linear feet of riprap bank would be created. In nearly all locations, this design creates a plantable corridor slightly more than 11 feet wide, so the proposed project would install just under 1 acre of stream bank corridor.

This bank treatment would be applied mostly upstream of the freeway. It cannot be used where vertical walls must be retained (e.g. left hand bank above De la Guerra Street), or other structural requirements dictate (e.g. nearly all the way below the sandstone channel, except the left hand bank below Yanonali Street).

As illustrated roughly in Fig. 5 poured walls would define the bottom portion of the channel but the bank above those walls would angle outward to the top of the bank. The sloped bank would consist of riprap 15 inches thick, top soil distributed through the interstices of the riprap, and all overlain by 10 inches of prepared topsoil. Native rock and soils as its base would

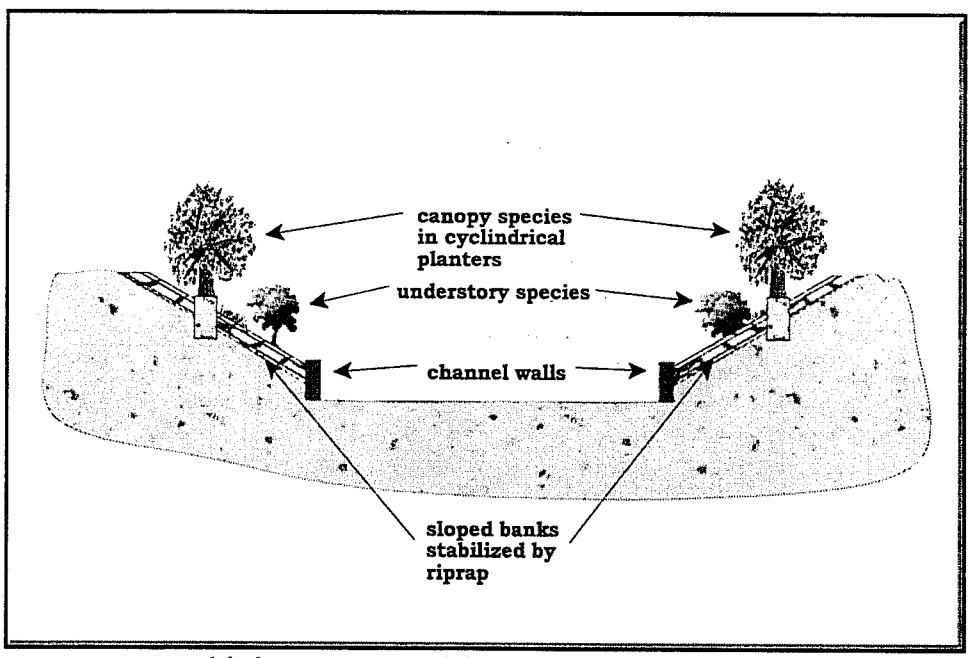


Fig. 5. Very simplified representation of the combined features of the preferred flood control design. It incorporates bank stabilization of riprap planted with native vegetation above low channel walls. It depicts a typical cross section of Mission Creek and suggests the opportunities for restoring the principal native species at the core of a riparian community: canopy species such sycamores, cottonwoods, live oaks, etc; and understory species such as arroyo willow, Mexican elderberry, coyote brush, etc.

accommodate planting riparian trees and shrubs. Large trees would be set out in defined planters which extend through the riprap. Willows would be planted as wattles below the riprap, to sprout through the interstices. Other native shrubs would be planted into the topsoil above the riprap. Appropriate, temporary irrigation would be installed to provide water long enough for plants to become fully established. Details of riprap slope construction, the selection of native plants to be

included, their maintenance expectations, and criteria of establishment and growth are presented in the Mitigation Monitoring Plan.

5.8 Box Culvert as Oxbow Bypass

The design capacity, 3400 ft^3/sec and which corresponds to a storm event that occurs once every 20 years on average, requires a means to convey water past the most constricted portion of Lower Mission Creek. That constriction exists at bridges within the oxbow portion of the existing channel. Currently, water spills out first at the Montecito Street Bridge and the railroad bridge immediately downstream of it. The project incorporates a box culvert to carry the bulk of storm events whose discharge exceeds the yearly average event (640 ft^3/sec, a recurrence interval of 2.3 years) as that means.

Originally, the culvert was designed to be 540 feet in length, and would have terminated in the vicinity of Chapala Street by coming through the wall of the sand stone channel. As now modified, the culvert will extend between the upper end of the oxbow and the Yanonali Street Bridge. The culvert and the existing watercourse will reunite immediately below that bridge. Design of this feature will lead all flows equal to or smaller than 640 ft^3/sec through the sandstone diversion channel, i.e. the existing course for Mission Creek. The design will not constrict in any substantive way the route water currently follows through the oxbow and sandstone channel.

When runoffs surpass that volume, the design will begin to divide storm flows into two paths by engaging the bypass culvert at the same time as directing some additional water (in excess of 640 ft^3/sec) to follow the existing path to the ocean. Volumes up to1050 ft^3/sec will be entrained through the oxbow and sandstone channel, just as they currently flow. Simultaneously, the culvert will shunt as much as 2350 ft^3/sec past the existing channel.

6 Structural Features Which Mitigate Temporary Adverse Effects

In actuality, a second fish species which is also Federally protected, steelhead (*Oncorhyncus mykiss*) are known to migrate through Mission Creek. Elements of the proposed flood control project intended as compensatory mitigation for incidental but adverse effects to tidewater gobies also apply to steelhead. This species is included hereafter.

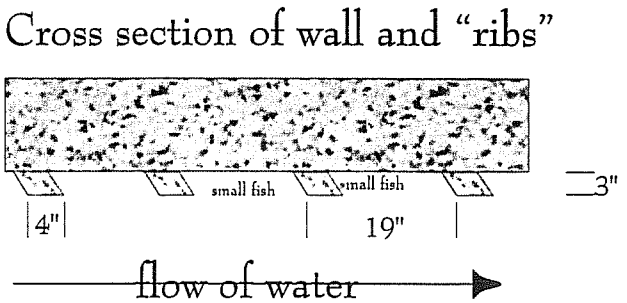
All impacts to either fish species would be of temporary nature. The project would not permanently reduce net reproductive rate ($R_0 \approx \int l_x m_x dx$), age-specific survivorship (l_x), age-specific fertility (m_x), or dispersal ability of either species. Incidental take is likely to occur despite environmental commitments described in Chapter 7 however, so mitigation is appropriate. Broadly, these elements would improve habitat conditions for both species. They are summarized in the following table and more detailed descriptions follow that.

Table 5. Structural features which each partially mitigate for adverse effects to steelhead and tidewater goby. Indirect benefits come about by raising the quality of aquatic habitat in the estuary or the riverine portions of the project area.

	direct compensatory benefits		indirect compensatory benefits	
Project feature	steelhead	tidewater goby	in-stream fauna	movement of water
soft bottom	natural sediments create rough surfaces which ease upstream migration	more bottom surface as foraging area	promotes larger invertebrate populations	lower runoff velocities
expanded estuary	larger area where smolts can bide their time just prior to entering the ocean	greater water volume to hide from predators		
ribs on estuary walls		a boundary layer refuge of lower velocity and eddy currents		no reduction of channel conveyance
horizontal ledges on estuary walls	sheltered overhangs as resting places	shelter from predators		no effects on channel conveyance
fish baffles on estuary walls	hiding places for smolts	hiding places	many species prosper in these varied microhabitats	no effects on channel conveyance
in-line and side weir at oxbow	prevents flows from entering culvert when steelhead could be present			divert all flows ≤640 ft^3/sec through existing watercourse
mid-stream boulder clusters	create heterogenous flow regimes and resting pools		varied microhabitat conditions would favor many species	absorb momentum of strong flow regimes
horizontal ledges on riverine walls	sheltered resting spots		promote scour pools where water persists through dry months	no effects on channel conveyance
fish baffles on riverine walls	turbulent and varied flow regimes during migration		varied microhabitat conditions would favor many species	no effects on channel conveyance

Fish refugia in the estuary. Permanent and durable mitigation features to create hiding places where fish may take refuge would be composed from three separate structural elements by forming coarse surface relief of the walls, artificial overhangs projecting from the walls, and placing double rows of coarse boulders between the overhangs along the walls of the estuary. In combination, they should provide shelter for fish of all sizes.

High-relief surface ornamentation where gobies and other small fish could escape strong currents would be made in a pattern of slanted ribs. Each would be molded as a parallelogram to stand 3 inches proud of the wall surface, 4 inches wide, and whose downstream face would form an acute angle to the wall. Nineteen inches would separate one from the next, as illustrated.



These molded ridges would extend from the ordinary high water mark to the bottom of the formed wall, roughly eight feet in vertical length. Most of the time water in the estuary would cover them completely and each would extend well below the streambed. Lower velocity and localized eddy currents would exist around these ribs, primarily caused by the effects of protruding ribs on the boundary layer adjacent to the wall itself. Small fish the size of gobies would easily find the recesses on their downstream side and take advantage of the refugia from currents created by these mitigation structures.

The second component of structural mitigation features, these intended primarily for steelhead and other large fish, would consist of projecting ledges. Ledges would jut perpendicularly from the wall 2 feet into the flow, be 6 inches thick, and roughly 50 feet long typically. Within the estuary, jutting ledges would be built at varying heights, say 10 to 20 inches, above the invert of the streambed and substantially below the ordinary high water level. Water would cover these ledges at all except the lowest low tides and all fish could easily swim beneath them.

The space between successive projecting ledges allows a third mitigation measure: boulders of sufficient weight to stay in place against the velocity of design events (approximately 8 ft/sec) (Hydraulics attachment). A double row of large, angular rocks would be nestled together and placed against the wall at the foot of the ribs. Ranks of boulders would extend into the creek about 5 feet from each wall. The innumerable crevices, voids between rocks, and spaces between rocks and the wall itself

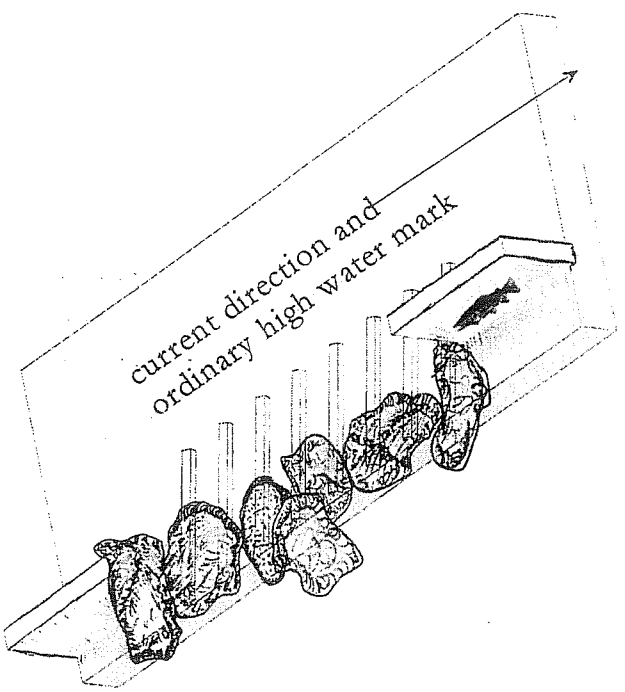


Fig. 6. Ribs, boulders, and ledges within the estuary. The streambed would be about level with the truncated bottom of the wall; not to scale.

formed in this orderly jumble would provide thoroughly natural habitat for small fish and invertebrates. A fraction of those spaces should prove large enough for steelhead smolt also to find shelter amongst the rocks

Ribs, boulders, and ledges would line both sides of the estuary between Cabrillo Boulevard and Mason Street. All surfaces in this section of the project would have all three features intermixed, although a ledge on one wall would face ribs and boulders on the opposite wall (Fig. 6, where ledges are not drawn to scale length). Lengths of the walls allow 380 linear feet of fish ribs and boulders and 240 linear feet of overhanging ledges on the left hand side; 360 linear feet of fish ribs and boulders and about 300 linear feet of ledges on the right-hand side. A more succinct rendering of these three mitigation features together appears in the Preliminary Design Plans attachment, sheet 8.

Locations in the estuarine portion of Mission Creek where ribs, boulders, and ledges would be built are shown in the Project Design attachment, Exhibit 4, sheets 1 and 2.

Underground bypass of oxbow channel. In actuality, the existing watercourse and the culvert must function as paired alternative channels which accomplish two separate needs. First, the existing oxbow must behave as the sole channel for all discharges less than the yearly average event (640 ft^3/sec, a recurrence interval of 2.3 years), i.e. the culvert cannot begin to accept any water until flows exceed 640 ft^3/sec. Secondly, when discharges exceed that threhold the water's momentum must carry it toward the culvert preferentially and away from the oxbow to counteract the existing route's tendency to take on flows in excess of the limiting conveyance capacity, i.e. flows larger than 1050 ft^3/sec must be captured by the culvert. At the design limit, the culvert will shunt as much as 2350 ft^3/sec past the existing channel while 1050 ft^3/sec pass through the oxbow.

This switching hydraulic property of oxbow and culvert can be achieved by construction of a weir which combines both lateral and in-line elements arranged in a direct line with the current and the entrance to the culvert. The plan drawings (**Hydraulics appendix**) depicts its length, width, cross-sectional profile, and combined lateral and in-line characteristics of the surfaces which establish the threshold at which water begins to enter the culvert. Based on numerical solutions (**Hydraulics appendix, HEC-RAS output**), it would need to be slightly taller than 3 feet to have an operational threshold of 640 ft^3/sec and approximately 240 feet in length to accommodate discharges in excess of 1050 ft^3/sec, the capacity of the oxbow channel. Further refinements of design criteria for the weir could emerge later during the project engineering design phase. Any such refinements would also incorporate recommendations from hydraulic evaluations by FWS itself.

The lateral portion of the weir complex which would extend toward the Gutierrez Street Bridge would occupy about 22 feet (to the outer side of the structure) of the finished design width of the stream bed itself, 50 feet wide (**Preliminary Design Plans attachment, sheet 9**). The difference, about 28 feet, would be creek bed with natural bottom. The existing stream bed along this specific portion of the creek tapers over a distance of about 125 feet from 35 feet wide (10.8 m as measured May 4th 2000) immediately below Gutierrez Street to about 22 feet. In the next 75 feet it widens again to approximately 27 feet. Thus, construction of the side portion of the weir can be achieved with no restriction compared to the existing streambed width. Water velocities adjacent to the weir are projected to range between 4.39 and 1.88 ft/sec at a discharge equal to 640 ft^3/sec (Hydraulics appendix, HEC-RAS output). The existing streambed passes through this constricted point at more than twice that, 9.37 ft/sec. Since the soft-bottom portion of the creek would be wider than the existing conditions than with the lateral weir in place, the weir would not increase

water velocities through this region of the creek; before water starts to pass over the weir. Indeed, water velocities between Gutierrerz Street and the start of the oxbow should be substantially lower than occur now.

The downstream end of the culvert would be at grade level, and the streambed here armored by riprap to prevent scour below the culvert. Before the controlling weir begins to pass water into the culvert and thus create a current through it, flows down the existing channel will back up into the culvert from the bottom and create a static pool of variable length depending on the discharge at the time.

Mid-stream boulder clusters. Baffle structures the full width of the streambed and 300 feet in length would combine clusters of large boulders and fields of riprap at two locations, the two separated by about 2350 linear feet of streambed (**Project Design attachment, Exhibit 4, sheets 3 and 5**).

Stone used for riprap would be as large as15 inches in diameter and of angular character. Larger boulders, essentially individual derrick stones of 3 to 4 feet diameter each, would be set down into the surrounding riprap, placed 5 to 8 feet apart, and arranged in clusters of 6 to 9 individual boulders. Tips of the rocks would protrude 1½ to 2 feet above the streambed (**Preliminary Design Plans, sheet 6**).

The boulder patches would constitute islands of very coarse and permanent streambed irregularities. Upstream of them, Mission Creek would tend to flow as a homogenous, single current. By their placement, these clusters ought to disrupt that flow regime and induce smaller and intertwined subcurrents. These many smaller currents should continually reshape the longitudinal profile over the length of the baffles fields and downstream of them for some way.

Each cluster of boulders would naturally form various internal cross currents and protected patches of water. Placement of clusters within the baffle field (**Project Design attachment, Exhibit 4, sheets 3 and 5**) is intended to promote the variety of water conditions trout seek out in natural streams, so clusters would be placed to outline a sinuous and meandering predominant channel, one that shifts back and forth across the streambed.

Ledges upstream of Mason Street. Overhangs of like design would be placed along the riverine sections of the creek (including the length between Mason and Yanonali Streets, otherwise treated as the upper end of the estuary) where currents should impinge against the wall and scour persistent holes under these ledges. Adult steelhead would have access to these pools during upstream migration. All manner of aquatic animals would take advantage of these sheltered pools throughout the dry season.

Walls on both sides of the creek would have them, placed as indicated by current patterns (**Project Design attachment, Exhibit 4, sheets 2, 4, and 5**). Four would be built along the left hand side (approximately 200 linear feet, in total) and five constructed against the right hand side (total of 250 feet in length).

Fish baffles upstream of Mason Street. Arrays of large boulders placed to the inside of walls would impart diverse flow patterns and a valuable measure of aquatic heterogeneity, lacking which the creek's streambed would mostly resemble an unrelentingly flat surface characterized by steady sheet flows. Their mass and position adjacent to the wall, and thereby within the boundary

currents inherent to sides of the channel, would minimize the incidence of currents dislodging them.

Each baffle would consist of a rank of large rocks or derrick stone placed touching the inside surface of the walls, with a second rank inside the first and closer to the creek. Rocks would stand proud of the streambed by 18 to 24 inches. Together, the two ranks would extend inward toward the creek approximately 5 feet. A space of 5 to 8 feet would separate individual rocks, or perhaps pairs of boulders, to facilitate periodic removal of sediments from between them.

Fish baffles would occupy locations in lower velocity sections of the creek, on one side or the other as appropriate to its curvature. In certain lengths of the creek side baffles would be placed along one side only, then for another length be built against the opposite side. Many baffles would extend along 150 feet of the creek's side, a few up to 200 feet in length, while others would be shorter by necessity. Design restrictions prevent their placement beneath bridges, for a certain distance on the upstream side of bridge abutments, and directly opposite other baffles or ledges.

The creek's channel allows fish baffles to be interspersed with ledges as indicated by the prevailing direction of currents and streambed to encourage formation of varied stream features (**Project Design attachment, Exhibit 4, sheets 2, 4, and 5**). Side baffles would be installed over approximately 1400 linear feet of the stream's edge; 675 linear feet of fish baffles on the left and 725 linear feet on the right side.

7 Environmental Commitments to Minimize Temporary Adverse Construction Effects

Spawning by tidewater gobies peaks in March and April (Roberts, 2000). They construct egg clutches in gravely substrates, such as that found in the tidal lagoon below Cabrillo Boulevard. Gobies would be expected sporadically in the estuary through summer and fall, but are unlikely ever to swim upstream of Yanonali Street, primarily because a low sill spans the full creek bed at that bridge where water is quite shallow after the rainy season, and secondarily because gobies prefer more saline waters compared to the flow issuing from the sandstone channel consists which entirely of fresh water.

Measures to lessen impacts to both fish species during streambed, toe-wall, and side slope construction would differ from those applicable during annual maintenance. All are inherently geared to the two species' respective behavior which leads to spawning in their respectively different habitats. Some measures appropriate to construction needs in the estuary (where construction would begin) are not appropriate farther upstream, so they are set out here as though in two separate regions. Work in the estuary will necessitate drying half of it at a time, from the center line to one bank, then switching sides for the opposite bank. A temporary construction exclosure is the preferred method for this requirement. While one half the estuary has thus been dried, normal tidal flush and flows regimes of the dry season can still pass through other half. At no time would the complete streambed be dammed. Work from the oxbow up will necessitate temporary diversion of lower flows. The least injurious method entails placement of a buried culvert into a suitable pilot channel and fitting its intake with appropriate fish barriers, and continuous monitoring.

Construction between Cabrillo Boulevard and Yanonali Street:

1. No construction work in water anywhere in the estuary from mid-December to mid- June;
2. divide a suitable length of the estuary down the middle with an impermeable barrier, perhaps sheet piling. That length should be as long as practicable to minimize repetition of this divide and dry procedure for making temporary construction exclosures. A lateral coffer dam in mid-stream shall not be acceptable because of increased turbidity and fine sediments that would conveyed downstream to the coastal lagoon;
3. Dam half the estuary at the upper end of the center-line barrier with sheet piling;
4. Qualified biologists walk downstream in zigzag pattern to herd as many fish as possible from the incipient exclosure;
5. Dam the lower end of the exclosure with sheet piling immediately;
6. Fish biologists seine the entire confined half thoroughly to remove any gobies and other large organisms to the estuarine water flowing by outside the construction exclosure;
7. Commence pumping water from the exclosure with intakes to pump fitted with ½ mesh screens;
8. Fish biologists monitor drying exclosure and seine it thoroughly at least twice a week;
9. When construction on one side has been complete, the downstream wall of the exclosure shall be removed first, followed by the upstream end;
10. Repetition of the steps above on the opposite bank

Construction between Highway 101 and Canon Perdido Street:

11. No mechanized equipment permitted in water between December 15 and the end of March;
12. Prior to starting work in the next region upstream, a qualified biologist would examine all scour pools at bridge abutments, undercut concrete ledges, etc.;
13. Any steelhead, or young salmonid fish in particular, found unexpectedly in these small refuges would be relocated upstream to a receiving area previously identified and agreed upon by FWS and CDFG and in a manner thoroughly consistent with appropriate transportation techniques. If authorized, the monitor shall weigh, measure, remove a sample of cheek scales, remove a sample of adipose fin, and apply a permanent identification tag of acceptable properties to each salmonid discovered and relocated;
14. The biological monitor shall prepare a written report giving all pertinent details of fish relocated;
15. Silt curtains shall be deployed below the immediate area of construction. Curtains would be deployed in pairs, with a gap at least 30 feet wide between the upstream and the downstream curtain to reduce suspended sediments in the water;
16. A temporary net of appropriate size as agreed upon by FWS and CDFG shall be strung across the existing low flow channel to prevent salmonids from entering the section of creek next to be constructed;
17. Once certified free of protected fish, the existing current would be diverted to a temporary pilot channel shall be scored in the center of the creekbed;
18. As many culvert pipes as determined necessary to carry anticipated low flows shall be placed into the pilot channel. A mesh filter no larger than ½ inch square shall cover the intake. Culverts shall be at least 24 inches in diameter. Culverts shall not be longer than 100 yards;

19. Once culverts have been placed, the biologist shall monitor each section at least twice a week to verify that screens are in place over intakes and water has not leaked into the local section under construction;
20. Prior to completion of work in a given section, the temporary net shall be resuspended upstream of the culvert intake and fully across the existing low flow channel;
21. Only then shall removal of the culvert and completion of the natural streambed downstream be allowed;
22. The pair of silt curtains shall be removed;
23. The next upstream segment of creek bed and banks shall be readied in like manner.

8 Environmental Commitments to Minimize Recurrent Adverse Effects During Future Channel Maintenance

8.1 Routine Maintenance Upstream of the Oxbow

Above Highway 101, a biennial cycle of maintenance activities shall be instituted which incorporates a mosaic pattern of sediment removal from half the creek's bottom and mechanical brushing of vegetation in the other half each year, then repeating the process in the other half the following year. Debris reducing the channel's capacity would thus be removed from half of it in any given year. Mechanized equipment would be used in the creek bed to restore conveyance capacity, and the maintenance procedures would emphasize partial retention of aquatic habitat conditions (**Preliminary Design Plans, sheet 1, typical cross-sections**). Appropriate measures for:

Regular de-silting and brushing of vegetation in the creek bed —

24. All routine maintenance shall be accomplished between August and mid-October;
25. A pair of silt curtain fences shall be set across the low flow not more than 100 yards downstream of the work area;
26. the fences shall be approximately 10 yards apart;
27. A qualified biologist would examine all pools at bridge abutments for young salmonids;
28. Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and California Fish and Game and relocated promptly to a suitable refuge;
29. A written report describing in detail any such relocations would be submitted to National Marine Fisheries Service;
30. Mechanized equipment would enter the creek via the access way at the parking lot of the church at Canon Perdido Street, that at Cota Street, or that immediately adjacent to the oxbow;
31. A front end loader or road grader working together with dump trucks (10 yd^3) would be used for the bulk of sediment and vegetation removal;
32. A swath half the channel wide shall then be cleaned, first along one side as seems convenient for an arbitrary distance (say, 250 feet), then switching to the opposite bank for another arbitrary distance;
33. the half of the streambed from which sediments are removed shall be completed by scoring a pilot channel as close as practical to the side baffles or ledges without hitting them and chamfer that dressed side gently from the center line to the pilot channel;
34. the pilot channel would routinely head toward and pass close to projecting ledges to keep water flowing in their general direction during the dry season;

35. vegetation in the other half shall be mowed to suppress the growth of woody perennials but still allow herbaceous perennials and annuals to grow;
36. If storm events of the next winter rains leave enough sediments to warrant their removal, then during the following summer the other half of the creek bed, that where only brushing of plants occurred the previous year, would be groomed to remove obstructing sediments and plants, and to shift the chamfer and the pilot channel to the opposite side;
37. If storm events do not reduce conveyance more than 15% then the next maintenance cycle shall involve only mowing of vegetation

for maintenance of side baffles, ledges, and mid-stream boulder clusters —

38. Sediments would be removed from among boulder clusters and large rocks of the side baffles only as needed to prevent them from being covered completely;
39. If necessary, sediments shall be dug from the downstream side of boulders with a backhoe equipped with a 3 foot bucket, then dragged toward the center of the creek to be combined with streambed sediments being removed as described previously;
40. any individual boulders that might have been dislodged mechanically or displaced by currents would be pushed back into a suitable vacant spot in the baffle and reset.
41. Any propagules of giant reed or salt cedar that have taken root shall be eliminated. A combination of foliar application of glyphosphate or digging out rhyzomes with hand tools could be employed. Application of herbicides should be very limited, confined to only those small locations where the most persistent and aggressive weedy plants begin to re-invade the creek bottom;
42. The remaining growth shall be cut back using a brush hog, or similar mowing attachment passed a couple feet over the tops of the rocks. The intent is to cut down woody species before they attain much height or stem expansion, but not to eradicate low-growing herbaceous plants that offer negligible friction to water currents.

8.2 Maintenance Expectations Between the Oxbow and Sandstone Channel

The weir's height would push all flows smaller than 640 ft^3/sec toward and through the sandstone channel. In effect, the pattern by which sediments currently settle in the sandstone channel would remain unchanged.

Removal of silts and vegetation between the Highway 101 bridge and through the sandstone channel would continue to follow current practices.

- Sediments and vegetation would be removed when channel capacity has been reduced by more than 15%;
- All routine maintenance shall be accomplished between August and mid-October;
- A qualified biologist would examine all pools at bridge abutments for young trout;
- Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and California Fish and Game and relocated promptly to a suitable refuge;
- A double line of straw bales or silt curtain shall be set across the lower end of the channel;
- A front-end loader would scoop all materials directly from the channel to trucks waiting above adjacent to the railroad tracks;
- The full width, 33 feet, would be cleaned of obstructive materials.

8.3 MAINTENANCE EXPECTATIONS WITHIN THE ESTUARY

Projections of sediment transport indicate greater erosion from storm events than currently takes place. During storms, water entering the culvert would carry less sediment than it could by virtue of the blocking effect of the weir. When flows through the culvert and sandstone channel converge, this volume of cleaner water would resuspend fine sediments. Hence, the net effect of the project within the estuary should shift the composition of the streambed to gravels and small rocks, rather than fine silty sediments. Removal of silty materials or other fine sediments from anywhere in the estuary should not become a maintenance requirement of the project.

9 CONCLUSIONS

The Corps of Engineers analyzed thoroughly the potential for impacts to tidewater gobies which implementation of the proposed flood control project could cause. The possible need to relocate them out of harm's way during construction, in a manner supervised and approved by the US Fish and Wildlife Service would constitute an unavoidable impact. Recognizing that, the Corps developed all feasible measures of mitigation in coordination with FWS and other concerned resource agencies.

The proposed action will result in temporary degradation of habitat and ecological resources found associated with the estuary and important to the life cycle of tidewater gobies. At the completion of construction work, late in the fall of the first year of the schedule, between Cabrillo Boulevard and Yanonali Street those temporary effects would have been overcome by the larger estuary (more than double in existing surface area) and the assorted refugia to provide hideouts for fish.

Water should move through this final portion of Mission Creek at similar velocities as occur presently because the creek bed would be both wider throughout and have a soft bottom of natural materials. Sediment deposition and erosion would differ only marginally from existing patterns. The substrate in the estuary should become coarser with more gravelly places than now.

Measures to reduce the impact to tidewater gobies include relocation of individuals by a knowledgeable and qualified biologist. Together, all measures should avoid long-term and permanent adverse effects to this population of tidewater gobies. The proposed scheduling commitments and monitoring would minimize any short-term potential effects.

The design and implementation of this proposed flood control project can be accomplished with only minimal adverse and temporary effects to tidewater gobies. The Corps anticipates design features and structural mitigation features should actually improve microhabitat conditions for gobies in Mission Creek's estuary.

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APPENDIX - A-2

REVISED BIOLOGICAL ASSESSMENT
STEELHEAD
LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

JUNE 2000

BIOLOGICAL ASSESSMENT
pertaining to

STEELHEAD (*Oncorhynchus mykiss*), LOWER MISSION CREEK FLOOD CONTROL PROJECT, SANTA BARBARA, CALIFORNIA

1. INTRODUCTION

The US Army Corps of Engineers (the Corps) prepared this revised Biological Assessment (BA) to comply with the Endangered Species Act of 1973, as amended (the Act). The Corps previously submitted a BA to the National Marine Fisheries Service (NMFS) with the Draft EIS/EIR in December 1999 for the proposed Lower Mission Creek flood control project in Santa Barbara, California. Since the release of the Draft EIS/EIR the project design has been modified to accommodate numerous changes. These modifications include: extension of the bypass culvert from 540 to 830 feet in length and a change in size and orientation of a weir to control the movement of water into the culvert. The Project Description attachment presents a thoroughly detailed project description. These modifications resulted in changes of our analysis of impacts and mitigation measures identified in the Draft EIS/EIR and initial BA. The Corps coordinated extensively with your office staff and other involved resource agencies in development of the project design and hydrological analyses. This revised BA includes detailed biological and hydraulic evaluations and mitigation measures.

Two Federally listed species, steelhead and tidewater goby, occur in Mission Creek. Two separate BA have been written to identify project related impacts, implementation of environmental commitments to minimize or avoid impacts to these species, and implementation of compensatory mitigation for impacts which may nonetheless occur to these species because of this proposed action. The BA for steelhead would be submitted to NMFS, because that agency has authority to ensure that marine resources would not be jeopardized by implementation of the project.

1.1 LIMITING FLOOD DAMAGES ON LOWER MISSION CREEK

The US Congress originally authorized feasibility analyses of various alternatives to curtail Mission Creek's tendency to flood as a Water Resources Development Authorization in 1962. The plan which the Corps devised to accomplish that Congressional directive would reduce flood

damages and partially redress historical deterioration of riparian habitat within the project's limits (Corps, 1999).

As proposed, the final portion of the existing stream channel, between Canon Perdido Street and Cabrillo Boulevard, would be widened to accommodate greater peak discharge, 3400 ft^3/sec, than this last section of Mission Creek presently conveys, about1050 ft^3/sec. In addition, an underground culvert designed to take on water in flows greater than 640 ft^3/sec would carry about ⅔ of the creek's conveyance past the narrowest place in the existing watercourse, a constriction in the so-called oxbow channel. Greater width of the streambed would come through excavation of existing stream banks. Except through the oxbow channel, it would have a natural bottom. It would be maintained regularly to preserve the operational characteristics of its design.

The streambed would be confined between vertical walls built in most places to half the height of the existing bank tops, on average between 3 and 6 feet. Those walls at the toe of the banks would constrain the currents, define the ordinary high water level somewhere up their sides, and form the load-bearing support to keep the upper part of the new banks in place. The banks exposed above the toe walls would be planted with native species of canopy and understory plants adapted to stream side habitat in southern coastal California. The Project Description enclosure, attached, presents all details of projection description.

1.2 Participants in Flood Control Project

The Corps is the lead Federal agency. Santa Barbara County Flood Control and Water Conservation District is the direct co-sponsor of the proposed action. In addition, an agreement was struck between the Flood Control District and the City of Santa Barbara. These two entities would share the non-Federal cost of the project.

1.3 Steelhead (*Oncorhynchus mykiss*) in Mission Creek

Mission Creek was evidently one of a limited number of suitable streams located south of the Santa Ynez River where in times past young fish swam to sea and adult fish returned to upper reaches as allowed by the runoff conditions of southern California's climatic irregularities (Cardenas, personal communication, 1998; Spina, personal communication, 1998; Trautwein, personal communication, 1997). Historic changes to watersheds and the riparian communities along streams which followed the settlements of and expansion throughout coastal California by Europeans, and were brought about by their systematic institution of agrarian economies, quickly degraded steelhead streams such as Mission Creek to greater or lesser extent. Urbanization continued that degradation. Nonetheless, it remains among the coastal streams of southern California considered by the National Marine Fisheries Service (NMFS) as a significant migratory corridor for steelhead when that agency designated the population of steelhead resident in the coastal waters of southern California an Evolutionarily Significant Unit (ESU) and listed the species as endangered (National Marine Fisheries Service, 1997). The California Department of Fish and Game concurs, reckoning Mission Creek as affording irregular but genetically vital opportunities for adult steelhead to reach upstream spawning beds during the winter months in small numbers (Cardenas, 1998).

The sporadic records of large salmonid fish in the Mission Creek watershed has been the source of differing opinions about its contemporary importance in the life history of steelhead. For

example, eleven years elapsed between documented sightings, 1984 to 1995, yet since the spring of 1998 many observations have been reported. The following summaries are indicative of the seemingly irregular appearance of steelhead in Mission Creek:

1984 — Small trout feeding near the Museum of Natural History in early June were identified by a specialist in marine mammals as steelhead (Santa Barbara News-Press, June 3, 1984);

April to June, 1995 — Part of the reconnaissance phase study which the Corps completed in 1995 sought definitive evidence regarding steelhead in Mission Creek. Systematic live trapping for salmonid fishes in Mission Creek did not detect migratory smolts in fish traps erected between Haley and Gutierrez Streets between April 26 and June 6, 1995. Electroshocking all the likely runs and riffles upstream from that location between April 26 and May 16, 1995 also did not disclose salmonid fish with the phenotypic traits of steelhead (Corps of Engineers, 1995). In total, eight trout were captured throughout the watershed, one near Oak Park and the other seven in Rattlesnake Creek, above its confluence with Mission Creek. Without exception, these fish each had all the features of resident, non-migratory rainbow trout (also recognized taxonomically as *Oncorhynchus mykiss*), were the size of rainbow (average length = 190 mm [about 7½ inches], standard deviation = 29.6 mm), and all but one were judged by analysis of scales to be nearly two years old. The single largest fish was more than two years old. Trout of this age, if they were steelhead, would ordinarily exhibit all the changes of appearance that identify them as steelhead smolt. Absence of these features indicates these eight would never display distinctive steelhead attributes;

May 24, 1995 — A single fish between 12 and 13 inches in length and described as having the "hooked lower jaw" reminiscent of steelhead was landed with a barbless fly from a run in Rattlesnake Creek. The fish was photographed, but an effort to take scale samples from it was fruitless (Trautwein, letters, 1995a, 1995b). "Additionally, two fish measuring an estimated 12" each were observed in a pool approximately 100 yards upstream from the site where the largest fish was captured." Other trout seen in nearby pools the same date were of the size range reported by the Corps' study, and thus could plausibly be resident and non-migratory rainbow trout;

1998 and1999 — Following the heavy runoff from El Niño rains in the spring of 1998, numerous large fish were reported at several locations above Oak Park in the fall of 1998. Knowledgeable ichthyologists were convinced by the body length, body depth at the pectoral fins, color patterns, and general behavior that these salmonids could not be anything other than steelhead (Cardenas, 1998; Johnson, 1999; Greenwald, 1999). By late June of 1999 very small fish were seen to accompany these larger adults in some of the larger pools near the Museum of Natural History (**see accompanying letter**) and upstream from there as far as the confluence of Mission and Rattlesnake Creeks (Johnson, 1999). To date, no genetic data has been obtained from any of these fish. Therefore, they cannot be declared definitively as from the southern evolutionary genotypic stocks;

2000 — A female 23 inches in length and a male 27 inches long were documented spawning in poor water and substrate conditions between de la Guerra and Ortega Streets on March 14th. The female made at least three clutches of eggs. The male was seen to fertilize one of them. Later in March, approximately 100 salmonids of the size typical of smolt were seen repeatedly in pools in Oak Park. They seemingly decamped after heavy rains in April, but no observations of them swimming to the ocean have been reported. Two salmonids, also of typical size to be smolt, were observed in salt water below the Mason Street bridge on the 4th of May (Moeur, 2000, field records).

That some among these fish seen over the last 15 years are steelhead, and therefore that Mission Creek has the potential still to provide suitable habitat conditions in some locations, seems no longer a debatable assertion.

Irregular appearance in coastal California streams seems to be a widespread trait within this part of the species' range. Steelhead belonging to the southern evolutionary population appear rather opportunistic in their migratory behavior, both in the number of individuals who make the ascent in any given year — in fact, years when none are seen anywhere in the creek are not uncommon — and the time of year when they enter the watershed. River flow seems to be the factor which most clearly prompts adults fish to try to reach spawning areas in southern California coastal streams. Since the quirks of winter storm patterns in this region cause quite unpredictable flow patterns from one year to the next, their migratory tendencies are controlled by this climatically irregular but annual phenomenon (Cardenas, 1998).

Rainfall data for the last 18 years are indicative of the variability in climate in the watershed of Mission Creek. Between October 1983 and May 2000, average total rainfall measured at the Santa Barbara Sanitation Station has equaled 19.94 inches. In this Mediterranean climate, very little of that rain comes between May and October, as shown by monthly average totals in Table 1 (following page). Nearly two thirds of the total annual rain falls in January, February, and March.

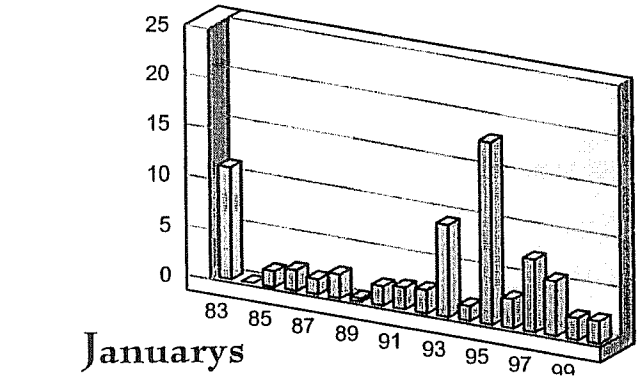
Three accompanying graphs show total rainfall measured in January and February for each year between 1983 and 2000. In a general way, these records show the rather erratic nature of rainfall in each of these three months from one year to the next. For example, the very heavy rains in January 1995 (about 18 inches in that month alone) were markedly greater than January of 1994, less than 2 inches, and virtually no rain fell in February of 1997 but a year later February total rainfall was greater than 20 inches. In fact, February, January, and March have the largest variability in monthly rainfall total, as shown by standard deviations of 5.09, 4.63, and 3.06, respectively.

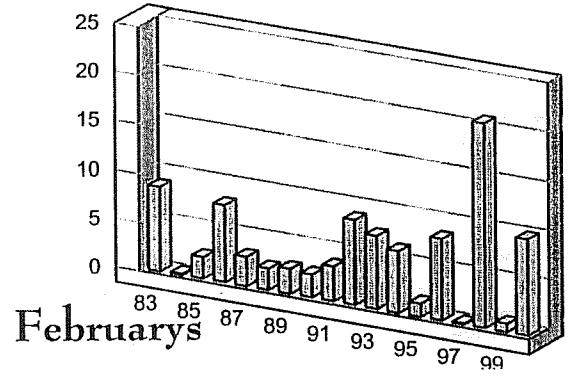
The inconsistency between years is often matched by inconsistency between successive months within one rainy season, e.g. the 18 inches of January 1995 were followed by scant rains in February (less than 2 inches), and moderate amounts again in March (about 8 inches, total). As another example, the most recent year of El Niño climatic patterns, 1998, brought about 2½ in January, close to 21 inches in February, and only about 4 inches in March.

Steelhead from this region have inherited the tendency to migrate streams in this region sometime between January and the end of March, but only sporadically from one year to the next in response to the rather fickle patterns of rain during those three months. The inconstant nature of coastal streams such as Mission Creek may well have selected against behavioral tendencies to migrate annually and without fail to spawning beds in the upper portions of the water shed when climatic conditions were not reliable enough from one year to the next to count on be able to reach those beds.

Table 1. Monthly rainfall in Santa Barbara, October 1983 to May 2000.
(Source:California Data Exchange Center; http://cdec.water.ca.gov/cgi-progs/staMeta?station-Id=SBR)

Month	average total (inches)	observed range (inches)	standard deviation	% of total average annual rainfall
Jan	4.18	0 - 18.2	4.63	20.95%
Feb	5.34	0.07 - 20.86	5.09	26.79%
Mar	3.37	0 - 11.05	3.06	16.87%
Apr	1.17	0 - 4.45	1.59	5.89%
May	0.35	0 - 2.76	0.66	1.75%
Jun	0.11	0 - 0.71	0.21	0.57%
Jul	0.05	0 - 0.52	0.13	0.24%
Aug	0.11	0 - 1.48	0.36	0.56%
Sep	0.39	0 - 3.66	0.92	1.97%
Oct	0.54	0 - 3.02	0.85	2.71%
Nov	1.68	0 - 4.64	1.39	8.40%
Dec	2.65	0 - 7.07	2.25	13.30%





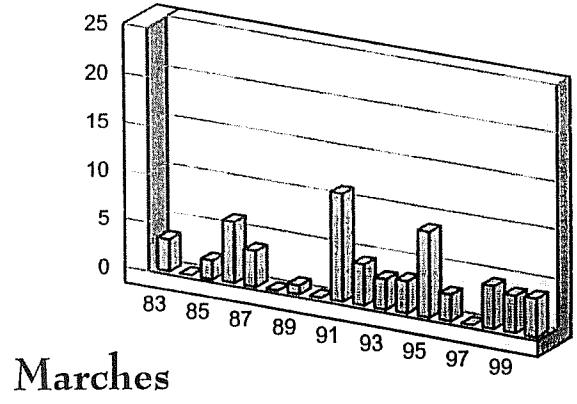


Table 1 and Figs. 1a, b, & c both pertain to precipitation records in Santa Barbara, from October 1983 through May 2000.

1.4 CRITICAL HABITAT

Critical habitat for steelhead (National Marine Fisheries Service, 1999a) evidently includes Mission Creek, although detailed maps and watershed descriptions are not available for inclusion in this BA. NMFS identified hydrologic units containing critical habitat for southern California steelhead and that called Santa Barbara Coastal (hydrologic unit No. 18060013) encompasses Mission Creek. In and of itself, this designation would require implementation of the flood control project in a way so as not to "appreciably diminish the value of critical habitat for both the survival and recovery" of steelhead, and consultation with NMFS under Section 7 of the Act.

2 Interagency Consultation

Section 7(a)(3) of the Act requires active consultation between the lead Federal agency and NMFS in any circumstance in which the lead agency concludes that its proposed action could affect an endangered or a threatened species. Direct effects and indirect effects must both be evaluated. In December 1999, the Corps initiated formal Section 7 Consultation. During preparation of the Draft EIS/EIR extensive coordination occurred between Corps and NMFS staff including reciprocal exchanges of information, discussions of habitat requirements, techniques of field observation, schemes to minimize influences on species while still accomplishing the stated purpose of the proposed project, cooperative site visits, exchanges of written ideas and information, fulfillment of requirements under other pertinent laws, and so forth. The Corps and NMFS have been engaged in such a dialogue since December 1997. Biologists from both agencies have together walked the entire length of the proposed flood control project to evaluate streambed conditions, general habitat of creek and banks, and importance of the lower reaches of Mission Creek as potential spawning or nursery habitat.

The Act requires formal consultation when the agencies determine that a proposed action "may affect" a species listed under and protected by the Act or habitat critical to the species' continued survival. The lead agency initiates formal Section 7 Consultation with a written request, which includes a Biological Assessment, to NMFS [Section 7(a)(2) of the Act] and concludes when NMFS issues a written Biological Opinion [Section 7(a)(3) of the Act].

The Corps submitted a Draft Biological Assessment to NMFS in December 1999. Since then, refinements of hydraulic calculations, sediment budgets, and design features have been under way. Those various supplements are included as separate enclosures which accompany this revised BA. The first of them is the complete and detailed Project Description. The second is the Final Hydraulics Documentation (Hydraulics appendix). The third enclosure consists of Preliminary Design Plans. The fourth enclosure is an independent analysis of shading patterns predicted from the arrangement of trees and shrubs to be planted as part of the project (the Shading appendix). The fifth and final enclosure is the Mitigation Monitoring Plan, which comes directly from Appendix H of the Draft EIS/EIR.

Based on this revised analysis and undisputable observations of steelhead within the project's limits since December 1999, the Corps re-initiates formal Section 7 Consultation with the National Marine Fisheries Service because the proposed flood control project may affect steelhead.

3. EXISTING CONDITIONS

Estuarine and riverine aquatic conditions occur within the area of the project and both portions of the creek have extensive urban influences. The proposed flood control project would necessitate construction in both portions. Adults steelhead must enter the creek through the estuary then transit the riverine portion of the creek. Any young steelhead spawned in the upper waters would do the reverse when of an age to swim to the ocean.

The descriptions which follow treat steelhead as an inhabitant of the creek's aquatic habitat, describe how changes of the streambed, sedimentary regime, and subsequent requirements for streambed maintenance would affect that aquatic habitat, and finally how changes to the existing vegetation on the creek's banks would improve water conditions in the creek's bed directly and indirectly improve migratory habitat for the length of the project. Overall and after maturation of native plants to be included, the proposed flood control project would have greater biological values when compared to the expectations of future conditions in the absence of this project.

3.1 AQUATIC HABITAT

As best Lower Mission Creek may be characterized, its aquatic habitat equates, roughly, to prevailing conditions below the ordinary high water mark, which over the actual length of the streambed included within this project (5380 linear feet) passes from fresh water at its upper end to saline at the lower end. Fresh water in character from Canon Perdido Street to Yanonali Street, 4320 linear feet (80% of the project length), Mission Creek is just barely a perennial stream however. Indeed, urban runoff alone may prevent the disappearance of surface water after late summer. Estuarine traits prevail over the creek's last 1060 linear feet to Cabrillo Boulevard (20% of the project length), becoming more pronounced since the daily interchange of fresh and salt water is greater closer to Cabrillo Boulevard. Commercial and residential development which took place historically along this last section of creek now constrain it within a nearly artificial channel: no mudflats dissected by tidal creeks remain anywhere along the estuary. No tracheophyte plant species ecologically associated with functional coastal marine communities remain anywhere along Mission Creek.

A sequence of man-made structures form a substantial portion of the existing watercourse through which steelhead have to pass. This section probably follows the naturally incised channel although that is not now evident. Mission Creek first bends to the right just above Highway 101, creating a feature known locally as the oxbow. In very quick succession thereafter, the oxbow leads water beneath the freeway (a box culvert bridge 140 feet wide), through a 60 foot length lined by riprap and wing walls, beneath Montecito Street (also a box culvert bridge, 60 feet wide), through a 20 foot section lined again by wing walls, beneath the bridge which elevates the railroad tracks (a central pillar bridge 70 feet wide), and then bends back to the left at the upper end of the historic sandstone-lined channel. The sandstone channel has a concrete bottom and carries water as far as the bridge at Yanonali Street (about 530 in length). The transition from fresh to brackish water effectively begins directly beneath the Yanonali bridge where a sill roughly 15 inches high spans the full width of the creek bed (entirely concrete at that point) and marks the upper limit of tidal influence, except perhaps during very severe winter storms.

In both the fresh-water and the estuarine segments its aquatic properties have been influenced to a very great degree by individual property owner's decisions to armor streambanks on their property, the toe of those banks, and even the creek bed itself in many locations against

erosion. Where concrete was placed below the ordinary high water mark, the result can be a solid projection into the low flow path of the creek in some places, a uniformly broad, flat surface (e.g. upstream of the Gutierrez Street Bridge), or concrete edges that confine the creek's low flow route to a narrow course. Estimates of the length of the streambed where only natural surfaces are evident (admitting the probable existence of some concrete now covered thoroughly by native sediments) were made by walking the creek. Natural sediments (silty muds and gravels) compose the streambed for about ⅔ of its length within the project area (3560/5380 = 0.66), while hardened surfaces cover roughly ⅓ the length of the stream bed (1820/5380 = 0.33).

The County Flood Control presently cleans the fresh water portions of the creek as needed to remove accumulated sediments, obstructive growth of plants, and accumulated debris. Sporadic accumulation which diminishes its conveyance capacity by more than 15% triggers that need for maintenance. That maintenance procedure has stripped the creek bed of most natural features that would have contributed to a heterogeneous stream channel. In fact, virtually all pools in this reach of Mission Creek have formed where complex hydraulic interactions between man-made structures and currents caused differential erosion and deposition of sediments. They are also transient for that very reason, and therefore tend to change in size from one season to the next. Those at bridge abutments are largest, e.g. estimated as 5 feet deep, 15 feet wide, and 40 feet long. Two such pools existed in May 1999. Concrete ledges poured by private owners have also created pools where currents undercut them. The longest seen in May 1999 was estimated as 25 feet in length and possibly 4 feet deep. The smallest such ledge pool was about 7 feet in length and perhaps a foot deep. Four undercut concrete sills of this nature were identified in May 1999. Two natural pools have formed amid rocks and concrete rubble in the oxbow. Each was approximately 10 feet long, 1½ feet deep and as wide as the channel. While these isolated pools were evident in May 1999, on the whole Mission Creek lacks any substantive areas of runs, riffles, pools, turbulent waters and eddies.

The existing streambed, albeit slightly squared in profile at many locations by periodic channel maintenance and constrained by numerous private revetments of assorted design, still suffices for mature steelhead to return up Mission Creek (Cardenas, 1998; Spina, 1998) and young steelhead to swim down its length. Concrete and trapezoidal channelization of the stream bed and banks upstream of this project probably hinders potential migration both directions in Mission Creek (Cardenas, 1998). Despite this physical impediment, and the existence considerably farther upstream of a small dam across Mission Creek to catch debris, the California Department of Fish and Game regards Mission Creek to be among the better streams for anadromous trout south of Point Conception because it still affords satisfactory capacity for salmonids to navigate the channel (Cardenas, 1998).

3.2 Stream Bank Vegetation

Construction of walls, an essential component of the project's design and without which the footprint of direct impacts would have to be twice as large to achieve the same conveyance, would require removal of most extant vegetation along 78% of the lower reach of Mission Creek, about 8420 linear feet (counting both the right and left banks). The remaining 22% of its existing banks, about 2340 linear feet (on both sides of the channel) between Highway 101 and the downstream side of Yanonali Street, are entirely bare of plant growth.

In those areas to be disturbed by stream bank construction, the presence of hardened bank surfaces currently exerts a strong effect on the abundance and vigor of plants along the creek. A soft bank occurs along 1940 linear feet of stream bank (counting both sides), while 6,480 linear feet (measured on both sides) have been armored by some means or other. In essence, hardened surfaces line about 77% of the creek's banks, aside from that stretch between the freeway and the upper most end of the estuary. Section 10 of the EIS/EIR provides details on existing vegetaion within the project reach. Maintenance, monitoring goals, success criteria for native plants to be included in the project's design, and so forth are identified in the Mitigation Monitoring Plan.

These revetments, of quite diverse materials and thoroughness, are not uniformly solid and impenetrable by plant roots. However, plants native to a stream side habitat in southern California are few and far between. Save for large and venerable western sycamores (*Platanus racemosa*) at six locations along the creek, it retains almost none of the stratification of canopy and understory species it must have had a century and more ago. Widely scattered arroyo willows (*Salix lasiolepis*) and white alders (*Alnus rhombifolia*) growing even more sparsely hint of what was once there below its riparian canopy, but nothing more than hint. Invasive non-native species compose virtually the entire plant assemblage along the creek. Now, giant reed (*Arundo donax*) forms the most conspicuous element of stream bank vegetation, and probably would rank highest in biomass of anything growing along the creek.

4. Potential Effects to Steelhead

4.1 Locus of Project along Lower Mission Creek

The proposed flood control construction along Mission Creek would extend from Cabrillo Boulevard at the downstream limit to the intersection of Castillo and Canon Perdido Streets (Fig. 3) at the upstream end of the project. It would entail:

- mechanical excavation and expansion of the streambed (except through the oxbow channel),
- construction of vertical walls of varying heights,
- construction of a culvert to create an alternative flow which bypasses the oxbow at discharges greater than 640 ft^3/sec,
- fabrication of several structural mitigation features,
- planting native trees and shrubs along reshaped bank and at select locations adjacent to the banks.

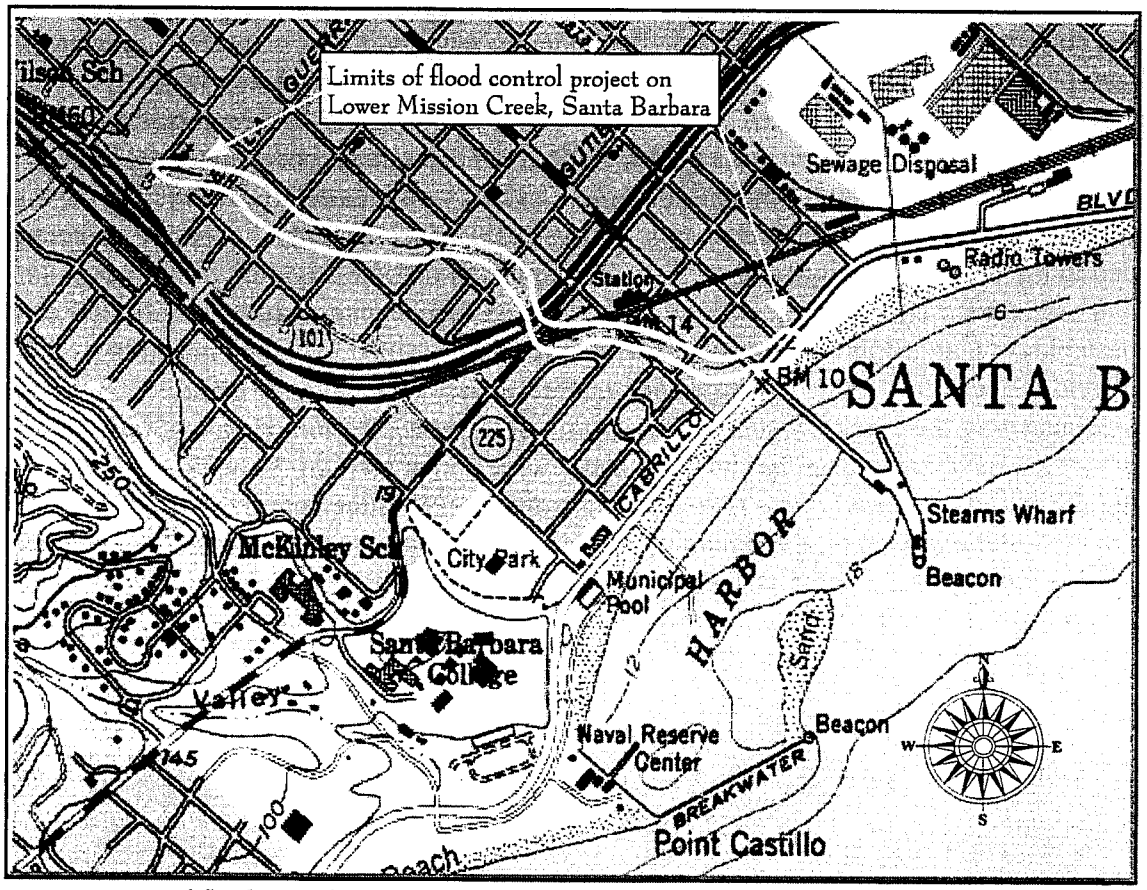


Fig. 4. Proposed flood control project would extend from Cabrillo Boulevard, at the lower end of Mission Creek, to Canon Perdido Street at the upper end. Excerpt from 7½ ′ USGS map, Santa Barbara Quadrangle.

Full descriptions of the project's design along each section of the creek may be found as an attachment, Project Description. The effects of specific components of the design which pertain directly to ecological requirements of steelhead are described in Chapter 5, which follows.

4.2 Flood Control Construction and Future Maintenance May Affect Steelhead

Construction between Cabrillo Boulevard and Yanonali Street. The most likely potential cause of adverse effects to steelhead will lie in the necessity to dry the streambed and toe of banks prior to construction. The plans for flood control construction would minimize this possibility through a combination of timing the work to give the best match to the life history patterns of steelhead migration, on-site monitoring for and supervised relocation of fish, and means to de-water only half the creek at any one time, thus always allowing steelhead unfettered movement in half the estuary. Nonetheless, netting and moving fish would affect them in a temporary and adverse manner. Please refer to the Mitigation Monitoring Plan for a summary of project related mitigation and monitoring.

Construction between the oxbow and Canon Perdido Street. Direct mechanical injury of fish or indirect but adverse effects such as impaired respiration caused by greatly increased turbidity could have impacts to steelhead while construction is underway in these upper waters of the project area. Measures to avoid or minimize unavoidable impacts include scheduling construction work outside the migration period, on-site monitoring for and supervised relocation of young salmonids encountered unexpectedly, temporary barricades at the upstream end of sections under construction to exclude smolt sized fish, or temporary use of a pilot channel through the current construction area screened at its upper end to block smolt-sized fish. Any fish netted and relocated would sustain adverse and temporary effects.

Routine channel maintenance. During winter storms, the creek presently scours pools at bridge abutments, e.g. the upstream side of that at Bath Street and that at Highway 101. These may persist through the dry season when sufficiently large and sheltered in the shade of the bridge itself. Although an unlikely event, young salmonids who get washed downstream before they are ready to swim to sea and are not yet strong enough to return to waters higher upstream would try to survive in such pools. As a precaution during the annual maintenance cycle, any young trout holding out in such refuges would be subject to supervised relocation. Steelhead netted and moved for their own well being would sustain adverse and temporary effects nonetheless.

5 Hydraulic Considerations on Migratory Behavior of Steelhead

The proposed designs to accommodate runoff equal to 3400 ft^3/sec through this region of Mission Creek necessitate structural changes of the creek bed and its banks. In turn, these will bring about hydraulic changes when compared to existing conditions. The effects of structural changes — wider streambed, soft bottom of the streambed upstream from Highway 101 and downstream of Yanonali Street, a uniform gradient of that streambed, lower water velocity at any given discharge, a shift of sedimentary deposition upstream from where bedloads now tend to settle, walls to confine the creek channel and keep the banks in place, and a culvert to bypass the oxbow channel — have been analyzed with appropriate numerical models. Results of those models constitute the second attachment to this BA. Interpretations of those results appear below in regard to ecological needs of steelhead during migration, typically as representative cross-sectional evaluations. However, these interpretations are not meant to substitute for those numerical results and the reader's attention is directed to that attachment for any and all relevant hydraulic information.

5.2 **Wider Creek and Channel.** Greater capacity of the streambed would come, in part, through lateral expansion by excavation of existing stream banks. Expansion of the creek's width would not be uniform throughout its length. Instead, different segments would widened different amounts:

Table 2. Larger streambed as a result of flood control design						
segments bounded by streets	existing creek bed width (average)		planned creek bed width		% increase	
	feet	acreage	feet	acreage	feet	acreage
Canon Perdido to Haley Streets:	25 feet	1.22 acres	43 feet	2.10 acres	75% wider	72% larger
Haley to Gutierrez Streets:	25 feet	0.39 acres	50 feet	0.78 acres	100 % wider	100% larger
Yanonali Street to Cabrillo Boulevard:	27 feet	0.69 acres	60 feet	1.54 acres	71% wider	220% larger
streambed habitat		**2.30 acres**		**4.42 acres**		**92% larger**
net change				**2.12 acres**		

5.3 Natural Bottom.

At present, concrete has been placed on the bottom or along the sides of the creek over at least 33% (1820 linear feet) of the streambed, or as estimated by existing streambed area, on about 20% of that (*ca.* 0.52 acres/2.3 acres = 0.2). Estimates are conservative because more could well be present but unseen because sediments cover it.

All existing hardened bottom would be removed and replaced by native sediments throughout except within the historic sandstone channel and beneath bridges already built as box culverts. In total, approximately 4450 linear feet of streambed would be surfaced with native sediments. Incorporating the three distinct widths of the final design — 43, 50, and 60 feet — the proposed design would yield approximately 4.4 acres streambed, and all this would be without any hardened surfaces, just soft, native sediments. This would amount to an increase of nearly 2⅛ acres over the current size.

The native sediments which underlay Mission Creek would become the actual stream bed after all existing hardened surfaces have been removed. Subsequent aggradation of materials derived from the Santa Ynez Mountains, primarily cobbles and coarse gravels, would restore the bottom's native irregular and varied texture. Together with finer sediments lodged among them, invertebrates and herbaceous plants would benefit incidentally.

5.4 Longitudinal Streambed Profile

The streambed will have a constant pitch when completed, particularly at bridges. No discontinuities in the slope of the creek's channel will occur anywhere within the project, nor at the transition to the trapezoidal section of Mission Creek upstream from Canon Perdido (see Hydraulics attachment). In consequence of this design feature, steelhead will not confront drop structures of any kind from either direction.

5.5 CURRENT VELOCITY

The existing stream channel has considerable topographic variability in addition to being rather narrow on average. The lateral expansion coupled with restoration of soft bottom throughout would have the overall effect of slowing the water at any given discharge. Calculations from appropriate numerical models of the stream channel (Hydraulics appendix, HEC-RAS output) were made at 50 foot intervals of measured stations. Among those, seven representative cross-sections have been selected to represent the general pattern (Table 3). These seven happen also to be the cross-sections for which sediment deposition budgets were calculated, as well. By location, they are shown in Fig. 3.

Table 3. Water velocities as calculated (HEC-RAS model) for seven representative stream cross-sections.

	Velocity (ft/sec) of Mission Creek when conveying 640 ft^3/sec	
representative cross section	existing channel	proposed wider channel
11	4.55	6.88
10	8.14	6.17
9	5.15	3.42
8	10.22	4.68
7	5.57	4.38
6	9.37	4.38
4	1.92	3.89

At two cross-sections, stream velocity is expected to rise compared to existing patterns. At five of them, stream velocities are projected to be lower than the current conditions. On average, stream velocity at a discharge equal to 640 ft^3/sec would by 95% of the current conditions.

5.6 SEDIMENT BUDGET

Stream flow data recorded through the period of record (at USGS stream gage station № 11119750 on Mission Creek near Mission Street, approximately 1½ miles upstream of the top of the project) were analyzed by appropriate statistical techniques (HEC-1 Flood Hydrograph Package, see Hydraulics attachment) to give valid and comparable models of peak and average daily flows. Such numerical models, called balanced hydrographs, then were applied in conjunction with the specific hydrograph of the record flood (that of January 10, 1995 when peak discharge reached 5200 ft^3/sec and the 24 hour average discharge was 1400 ft^3/sec) to calculate projected movement of sediments.

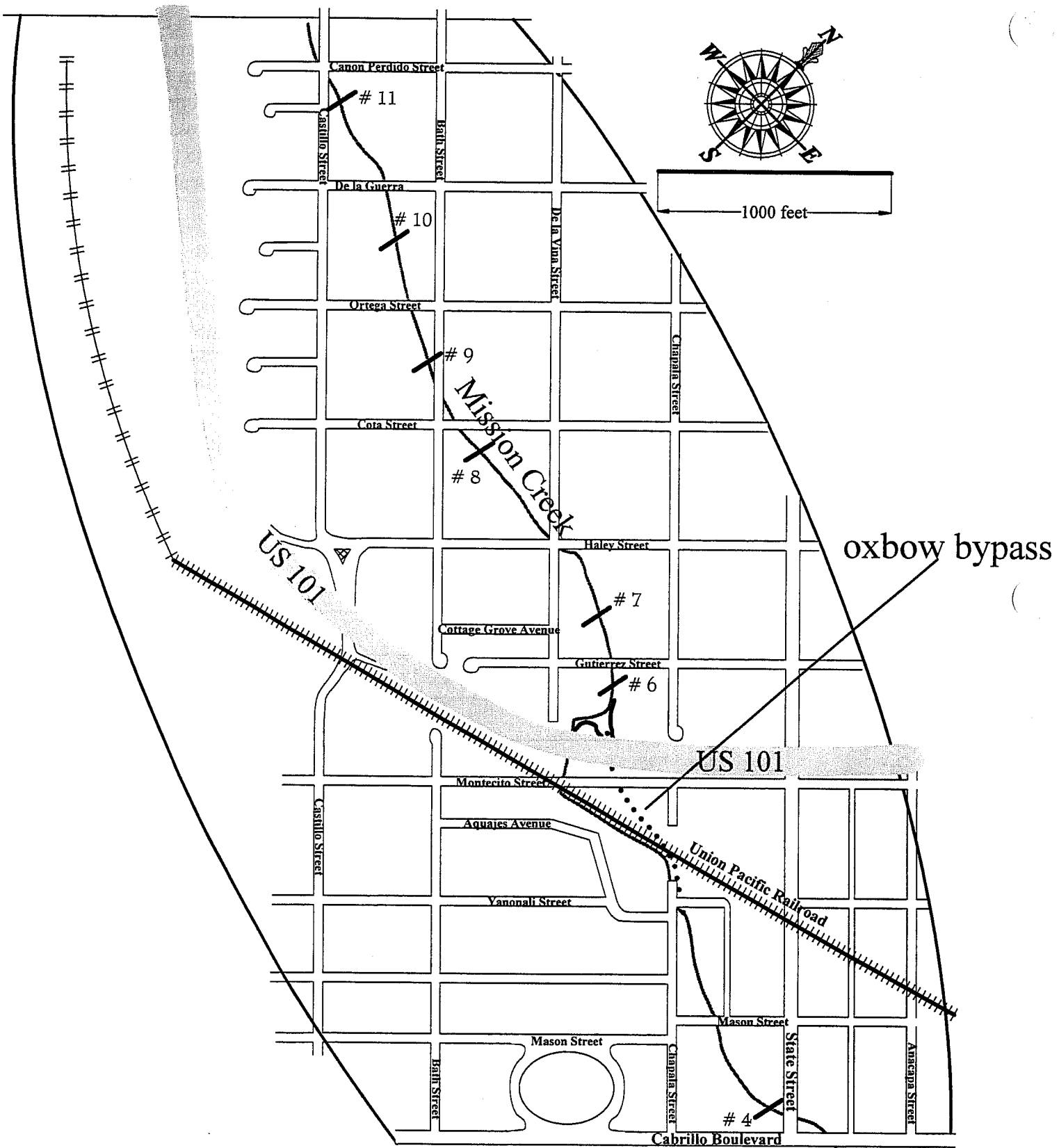


Fig. 3. Location of representative cross-sections

Each calculation (Table 4) pertains to a single storm event, even though the present and future needs to remove sediments arise from net aggradation from the sporadic patterns of individual storms over a period of time. Projections for sediment movement at seven representative cross-sections (Fig. 3) have been derived at three representative levels of discharge. In a harsh year, the sediments from many storms could trigger repeated maintenance cycles within certain reaches of the creek. On the other hand, several mild winter seasons may come and go without need for any maintenance of the streambed.

Table 4. Anticipated pattern of sediment deposition or erosion at seven cross sections on Lower Mission Creek. Results come from numeric modeling of sediments budgets based on balanced, synthetic hydrographs for each of three flow conditions. All results are in units of cubic yards (yd^3) and represent the expectation of sediment movement arising from a single storm event whose peak conveyance corresponds to either the yearly average event for Mission Creek (640 ft^3/sec), a storm event that occurs on average once every 5 years (1470 ft^3/sec), or a storm event that occurs on average once every 20 years (3400 ft^3/sec). Columns headed 'current' and 'designed' show sediment patterns for the existing conditions and the proposed flood control project, respectively. The columns headed 'difference' show how sediment patterns would change as a result of the project.

Cross section	net effect	640 ft^3/sec discharge			1470 ft^3/sec discharge			3400 ft^3/sec discharge		
		current	designed	difference	current	designed	difference	current	designed	difference
# 11	erosion	-333	-1850	-1517	-939	-5081	-4142	-2683	-14155	-11471
# 10	deposition	-820	1348	2168	-2075	3691	5767	-5305	10251	15555
# 9	erosion	252	-297	-549	599	-1384	-1983	1425	-5862	-7287
# 8	deposition	383	483	100	1061	1892	831	2973	7268	4294
# 7	deposition	-1181	185	1365	-3237	513	3750	-8991	1444	10434
# 6	erosion	592	-56	-648	1624	-111	-1736	4518	-198	-4715
# 4	erosion	581	-313	-895	1594	-928	-2522	4422	-2773	-7196
net difference				25 yd^3			-35 yd^3			-385 yd^3

Sedimentary regimes are predicted to change most at cross-sections 10 and 7. In both locations, the current erosive pattern would shift to one of net deposition. The opposite kind of change, from a current depositional pattern to one of net erosion during a storm event, would characterize three cross-sections. For example, storm events would be expected to remove silts and fine sediments from the estuarine section of the creek, cross-section 4. A similar change to net erosion would occur at cross-sections 9 and 6, both upstream of Highway 101.

The change from existing conditions to design conveyance capacity would alter the net sediment budget for the entire project very slightly. A net total of 25 yd^3 should accumulate each time the creek carries an average storm event. In contrast, individual higher peak flows should promote net erosion from the streambed, 35 yd^3 during a 5-year storm event and roughly ten times that quantity removed during a single design event.

5.7 Toe-Walls and Banks Stabilized by Ungrouted Riprap and Planted with Native Species

Bank stabilization upstream of Highway 101 would rely primarily on slopes armored by riprap. Cylindrical planters placed through the riprap would admit canopy and understory species. The final surface would be hydro-seeded with an appropriate mixture of annual and perennial native grasses. In total, about 3900 linear feet of riprap bank would be created. In nearly all locations, this design creates a plantable corridor slightly more than 11 feet wide, so the proposed project would install just under 1 acre of stream bank corridor.

This bank treatment would be applied mostly upstream of the freeway. It cannot be used where vertical walls must be retained (e.g. left hand bank above De la Guerra Street), or other structural requirements dictate (e.g. nearly all the way below the sandstone channel, except the left hand bank below Yanonali Street).

As illustrated roughly in Fig. 4 poured walls would define the bottom portion of the channel but the bank above those walls would angle outward to the top of the bank. The sloped bank would consist of riprap 15 inches thick, top soil distributed through the interstices of the riprap, and all overlain by 10 inches of prepared topsoil. Native rock and soils as its base would

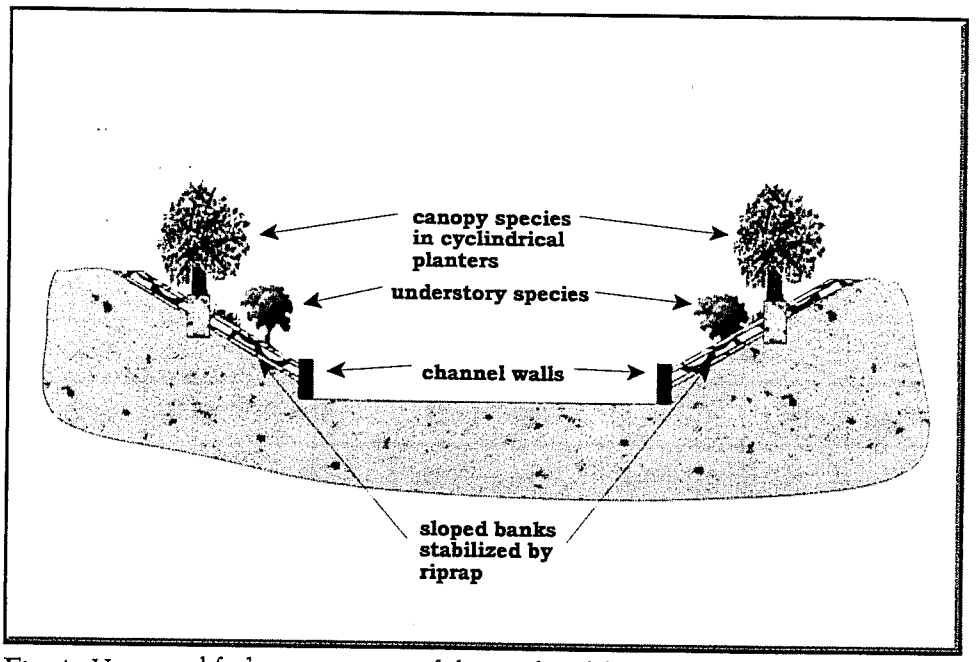


Fig. 4. Very simplified representation of the combined features of the preferred flood control design. It incorporates bank stabilization of riprap planted with native vegetation above low channel walls. It depicts a typical cross section of Mission Creek and suggests the opportunities for restoring the principal native species at the core of a riparian community: canopy species such sycamores, cottonwoods, live oaks, etc; and understory species such as arroyo willow, Mexican elderberry, coyote brush, etc.

accommodate planting riparian trees and shrubs. Large trees would be set out in defined planters which extend through the riprap. Willows would be planted as wattles below the riprap, to sprout through the interstices. Other native shrubs would be planted into the topsoil above the riprap. Appropriate, temporary irrigation would be installed to provide water long enough for plants to

become fully established. Details of riprap slope construction, the selection of native plants to be included, their maintenance expectations, and criteria of establishment and growth are presented in the Mitigation Monitoring Plan.

5.8 Box Culvert as Oxbow Bypass

The design capacity, 3400 ft^3/sec and which corresponds to a storm event that occurs once every 20 years on average, requires a means to convey water past the most constricted portion of Lower Mission Creek. That constriction exists at bridges within the oxbow portion of the existing channel. Currently, water spills out first at the Montecito Street Bridge and the railroad bridge immediately downstream of it. The project incorporates a box culvert to carry the bulk of storm events whose discharge exceeds the yearly average event (640 ft^3/sec, a recurrence interval of 2.3 years) as that means.

The culvert will extend between the upper end of the oxbow and the Yanonali Street Bridge. The culvert and the existing watercourse will reunite immediately below that bridge. Design of this feature will lead all flows equal to or smaller than 640 ft^3/sec through the sandstone diversion channel, i.e. the existing course for Mission Creek. The design will not constrict in any substantive way the route water currently follows through the oxbow and sandstone channel.

When runoffs surpass that volume, the design will begin to divide storm flows into two paths by engaging the bypass culvert at the same time as directing some additional water (in excess of 640 ft^3/sec) to follow the existing path to the ocean. Volumes up to1050 ft^3/sec will be entrained through the oxbow and sandstone channel, just as they currently flow. Simultaneously, the culvert will shunt as much as 2350 ft^3/sec past the existing channel.

6 Structural Features Which Mitigate Temporary Adverse Effects

In actuality, a second fish species which is also Federally protected, tidewater goby (*Eucyclogobius newberryi*) inhabits the estuarine portion of Mission Creek. Elements of the proposed flood control project intended as compensatory mitigation for incidental but adverse effects to steelhead also apply to tidewater gobies. This species is included hereafter.

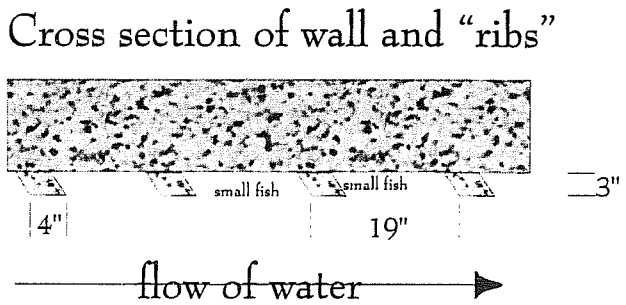
All impacts to either fish species would be of temporary nature. The project would not permanently reduce net reproductive rate ($R_0 \approx \int l_x m_x dx$), age-specific survivorship (l_x), age-specific fertility (m_x), or dispersal ability of either species. Incidental take is likely to occur despite environmental commitments described in Chapter 7 however, so mitigation is appropriate. Broadly, these elements would improve habitat conditions for both species. They are summarized in the following table and more detailed descriptions follow that.

Table 5. Structural features which each partially mitigate for adverse effects to steelhead and tidewater goby. Indirect benefits come about by raising the quality of aquatic habitat in the estuary or the riverine portions of the project area.

	direct compensatory benefits		indirect compensatory benefits	
Project feature	steelhead	tidewater goby	in-stream fauna	movement of water
soft bottom	natural sediments create rough surfaces which ease upstream migration	more bottom surface as foraging area	promotes larger invertebrate populations	lower runoff velocities
expanded estuary	larger area where smolts can bide their time just prior to entering the ocean	greater water volume to hide from predators		
ribs on estuary walls		a boundary layer refuge of lower velocity and eddy currents		no reduction of channel conveyance
horizontal ledges on estuary walls	sheltered overhangs as resting places	shelter from predators		no effects on channel conveyance
fish baffles on estuary walls	hiding places for smolts	hiding places	many species prosper in these varied microhabitats	no effects on channel conveyance
in-line and side weir at oxbow	prevents flows from entering culvert when steelhead could be present			divert all flows ≤640 ft^3/sec through existing watercourse
mid-stream boulder clusters	create heterogenous flow regimes and resting pools		varied microhabitat conditions would favor many species	absorb momentum of strong flow regimes
horizontal ledges on riverine walls	sheltered resting spots		promote scour pools where water persists through dry months	no effects on channel conveyance
fish baffles on riverine walls	turbulent and varied flow regimes during migration		varied microhabitat conditions would favor many species	no effects on channel conveyance

Fish refugia in the estuary. Permanent and durable mitigation features to create hiding places where fish may take refuge would be composed from three separate structural elements by forming coarse surface relief of the walls, artificial overhangs projecting from the walls, and placing double rows of coarse boulders between the overhangs along the walls of the estuary. In combination, they should provide shelter for fish of all sizes.

High-relief surface ornamentation where gobies and other small fish could escape strong currents would be made in a pattern of slanted ribs. Each would be molded as a parallelogram to stand 3 inches proud of the wall surface, 4 inches wide, and whose downstream face would form an acute angle to the wall. Nineteen inches would separate one from the next, as illustrated.



These molded ridges would extend from the ordinary high water mark to the bottom of the formed wall, roughly eight feet in vertical length. Most of the time water in the estuary would cover them completely and each would extend well below the streambed. Lower velocity and localized eddy currents would exist around these ribs, primarily caused by the effects of protruding ribs on the boundary layer adjacent to the wall itself. Small fish the size of gobies would easily find the recesses on their downstream side and take advantage of the refugia from currents created by these mitigation structures.

The second component of structural mitigation features, these intended primarily for steelhead and other large fish, would consist of projecting ledges. Ledges would jut perpendicularly from the wall 2 feet into the flow, be 6 inches thick, and roughly 50 feet long typically. Within the estuary, jutting ledges would be built at varying heights, say 10 to 20 inches, above the invert of the streambed and substantially below the ordinary high water level. Water would cover these ledges at all except the lowest low tides and all fish could easily swim beneath them.

The space between successive projecting ledges allows a third mitigation measure: boulders of sufficient weight to stay in place against the velocity of design events (approximately 8 ft/sec) (Hydraulics attachment). A double row of large, angular rocks would be nestled together and placed against the wall at the foot of the ribs. Ranks of boulders would extend into the

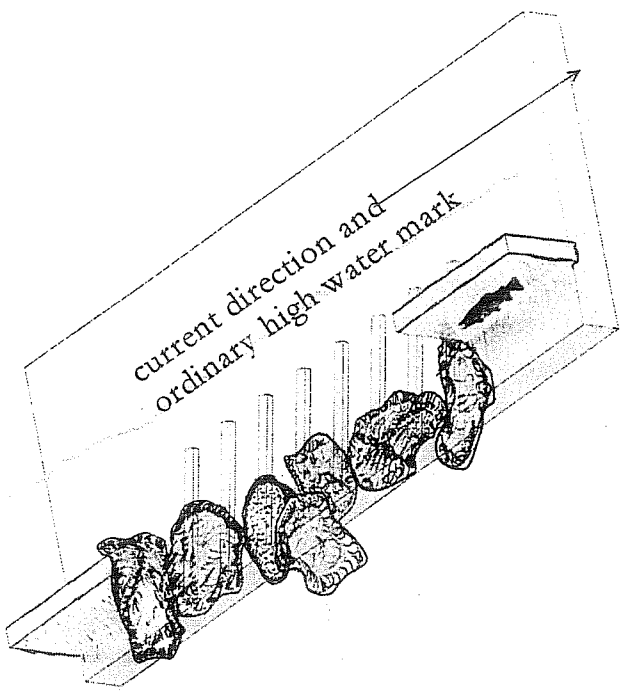


Fig. 6. Ribs, boulders, and ledges within the estuary. The streambed would be about level with the truncated bottom of the wall; not to scale.

creek about 5 feet from each wall. The innumerable crevices, voids between rocks, and spaces between rocks and the wall itself formed in this orderly jumble would provide thoroughly natural habitat for small fish and invertebrates. A fraction of those spaces should prove large enough for steelhead smolt also to find shelter amongst the rocks

Ribs, boulders, and ledges would line both sides of the estuary between Cabrillo Boulevard and Mason Street. All surfaces in this section of the project would have all three features intermixed, although a ledge on one wall would face ribs and boulders on the opposite wall (Fig. 6, where ledges are not drawn to scale length). Lengths of the walls allow 380 linear feet of fish ribs and boulders and 240 linear feet of overhanging ledges on the left hand side; 360 linear feet of fish ribs and boulders and about 300 linear feet of ledges on the right-hand side. A more succinct rendering of these three mitigation features together appears in the Preliminary Design Plans attachment, sheet 8.

Locations in the estuarine portion of Mission Creek where ribs, boulders, and ledges would be built are shown in the Project Design attachment, Exhibit 4, sheets 1 and 2.

Underground bypass of oxbow channel.

In actuality, the existing watercourse and the culvert must function as paired alternative channels which accomplish two separate needs. First, the existing oxbow must behave as the sole channel for all discharges less than the yearly average event (640 ft^3/sec, a recurrence interval of 2.3 years), i.e. the culvert cannot begin to accept any water until flows exceed 640 ft^3/sec. Secondly, when discharges exceed that threhold the water's momentum must carry it toward the culvert preferentially and away from the oxbow to counteract the existing route's tendency to take on flows in excess of the limiting conveyance capacity, i.e. flows larger than 1050 ft^3/sec must be captured by the culvert. At the design limit, the culvert will shunt as much as 2350 ft^3/sec past the existing channel while 1050 ft^3/sec pass through the oxbow.

This switching hydraulic property of oxbow and culvert can be achieved by construction of a weir which combines both lateral and in-line elements arranged in a direct line with the current and the entrance to the culvert. The plan drawings (**Hydraulics appendix**) depicts its length, width, cross-sectional profile, and combined lateral and in-line characteristics of the surfaces which establish the threshold at which water begins to enter the culvert. Based on numerical solutions (**Hydraulics appendix, HEC-RAS output**), it would need to be slightly taller than 3 feet to have an operational threshold of 640 ft^3/sec and approximately 240 feet in length to accommodate discharges in excess of 1050 ft^3/sec, the capacity of the oxbow channel. Further refinements of design criteria for the weir could emerge later during the project engineering design phase. Any such refinements would also incorporate recommendations from hydraulic evaluations by NMFS itself.

The lateral portion of the weir complex which would extend toward the Gutierrez Street Bridge would occupy about 22 feet (to the outer side of the structure) of the finished design width of the stream bed itself, 50 feet wide (**Preliminary Design Plans attachment, sheet 9**). The difference, about 28 feet, would be creek bed with natural bottom. The existing stream bed along this specific portion of the creek tapers over a distance of about 125 feet from 35 feet wide (10.8 m as measured May 4th 2000) immediately below Gutierrez Street to about 22 feet. In the next 75 feet it widens again to approximately 27 feet. Thus, construction of the side portion of the weir can be achieved with no restriction compared to the existing streambed width. Water velocities adjacent

to the weir are projected to range between 4.39 and 1.88 ft/sec at a discharge equal to 640 ft^3/sec (Hydraulics appendix, HEC-RAS output). The existing streambed passes through this constricted point at more than twice that, 9.37 ft/sec. Since the soft-bottom portion of the creek would be wider than the existing conditions than with the lateral weir in place, the weir would not increase water velocities through this region of the creek; before water starts to pass over the weir. Indeed, water velocities between Gutierrerz Street and the start of the oxbow should be substantially lower than occur now.

The downstream end of the culvert would be at grade level, and the streambed here armored by riprap to prevent scour below the culvert. Before the controlling weir begins to pass water into the culvert and thus create a current through it, flows down the existing channel will back up into the culvert from the bottom and create a static pool of variable length depending on the discharge at the time.

Mid-stream boulder clusters. Baffle structures the full width of the streambed and 300 feet in length would combine clusters of large boulders and fields of riprap at two locations, the two separated by about 2350 linear feet of streambed (**Project Design attachment, Exhibit 4, sheets 3 and 5**).

Stone used for riprap would be as large as15 inches in diameter and of angular character. Larger boulders, essentially individual derrick stones of 3 to 4 feet diameter each, would be set down into the surrounding riprap, placed 5 to 8 feet apart, and arranged in clusters of 6 to 9 individual boulders. Tips of the rocks would protrude 1½ to 2 feet above the streambed (**Preliminary Design Plans, sheet 6**).

The boulder patches would constitute islands of very coarse and permanent streambed irregularities. Upstream of them, Mission Creek would tend to flow as a homogenous, single current. By their placement, these clusters ought to disrupt that flow regime and induce smaller and intertwined subcurrents. These many smaller currents should continually reshape the longitudinal profile over the length of the baffles fields and downstream of them for some way.

Each cluster of boulders would naturally form various internal cross currents and protected patches of water. Placement of clusters within the baffle field (**Project Design attachment, Exhibit 4, sheets 3 and 5**) is intended to promote the variety of water conditions trout seek out in natural streams, so clusters would be placed to outline a sinuous and meandering predominant channel, one that shifts back and forth across the streambed.

Ledges upstream of Mason Street. Overhangs of like design would be placed along the riverine sections of the creek (including the length between Mason and Yanonali Streets, otherwise treated as the upper end of the estuary) where currents should impinge against the wall and scour persistent holes under these ledges. Adult steelhead would have access to these pools during upstream migration. All manner of aquatic animals would take advantage of these sheltered pools throughout the dry season.

Walls on both sides of the creek would have them, placed as indicated by current patterns (**Project Design attachment, Exhibit 4, sheets 2, 4, and 5**). Four would be built along the left hand side (approximately 200 linear feet, in total) and five constructed against the right hand side (total of 250 feet in length).

Fish baffles upstream of Mason Street. Arrays of large boulders placed to the inside of walls would impart diverse flow patterns and a valuable measure of aquatic heterogeneity, lacking which the creek's streambed would mostly resemble an unrelentingly flat surface characterized by steady sheet flows. Their mass and position adjacent to the wall, and thereby within the boundary currents inherent to sides of the channel, would minimize the incidence of currents dislodging them.

Each baffle would consist of a rank of large rocks or derrick stone placed touching the inside surface of the walls, with a second rank inside the first and closer to the creek. Rocks would stand proud of the streambed by 18 to 24 inches. Together, the two ranks would extend inward toward the creek approximately 5 feet. A space of 5 to 8 feet would separate individual rocks, or perhaps pairs of boulders, to facilitate periodic removal of sediments from between them.

Fish baffles would occupy locations in lower velocity sections of the creek, on one side or the other as appropriate to its curvature. In certain lengths of the creek side baffles would be placed along one side only, then for another length be built against the opposite side. Many baffles would extend along 150 feet of the creek's side, a few up to 200 feet in length, while others would be shorter by necessity. Design restrictions prevent their placement beneath bridges, for a certain distance on the upstream side of bridge abutments, and directly opposite other baffles or ledges.

The creek's channel allows fish baffles to be interspersed with ledges as indicated by the prevailing direction of currents and streambed to encourage formation of varied stream features (**Project Design attachment, Exhibit 4, sheets 2, 4, and 5**). Side baffles would be installed over approximately 1400 linear feet of the stream's edge; 675 linear feet of fish baffles on the left and 725 linear feet on the right side.

7 Environmental Commitments to Minimize Temporary Adverse Construction Effects

If stream flow conditions are suitable, adult steelhead would be most likely to try the ascent between the middle of December and the end of March. Adolescent steelhead could be present in the creek from the middle of March through late May, on their way to the ocean. Their tenure in the lower creek depends on the speed of changes necessary for them to tolerate salt water after the first phase of life in fresh. Those complex changes transform them physiologically from young trout into steelhead smolt.

Spawning by tidewater gobies peaks in March and April. They construct egg clutches in gravely substrates, such as that found in the tidal lagoon below Cabrillo Boulevard. Gobies would be expected sporadically in the estuary through summer and fall, but are unlikely ever to swim upstream of Yanonali Street, primarily because a low sill spans the full creek bed at that bridge where water is quite shallow after the rainy season, and secondarily because gobies prefer more saline waters compared to the flow issuing from the sandstone channel consists which entirely of fresh water.

Measures to lessen impacts to both fish species during streambed, toe-wall, and side slope construction would differ from those applicable during annual maintenance. All are inherently geared to the two species' respective behavior which leads to spawning in their respectively different habitats. Some measures appropriate to construction needs in the estuary (where

construction would begin) are not appropriate farther upstream, so they are set out here as though in two separate regions. Work in the estuary will necessitate drying half of it at a time, from the center line to one bank, then switching sides for the opposite bank. A temporary construction exclosure is the preferred method for this requirement. While one half the estuary has thus been dried, normal tidal flush and flows regimes of the dry season can still pass through other half. At no time would the complete streambed be dammed. Work from the oxbow up will necessitate temporary diversion of lower flows. The least injurious method entails placement of a buried culvert into a suitable pilot channel and fitting its intake with appropriate fish barriers, and continuous monitoring.

Construction between Cabrillo Boulevard and Yanonali Street:

1. No construction work in water anywhere in the estuary from mid-December to mid- June;
2. divide a suitable length of the estuary down the middle with an impermeable barrier, perhaps sheet piling. That length should be as long as practicable to minimize repetition of this divide and dry procedure for making temporary construction exclosures. A lateral coffer dam in mid-stream shall not be acceptable because of increased turbidity and fine sediments that would conveyed downstream to the coastal lagoon;
3. Dam half the estuary at the upper end of the center-line barrier with sheet piling;
4. Qualified biologists walk downstream in zigzag pattern to herd as many fish as possible from the incipient exclosure;
5. Dam the lower end of the exclosure with sheet piling immediately;
6. Fish biologists seine the entire confined half thoroughly to remove any gobies and other large organisms to the wet side of the construction exclosure;
7. Commence pumping water from the exclosure with intakes to pump fitted with ½ mesh screens;
8. Fish biologists monitor drying exclosure and seine it thoroughly at least twice a week;
9. When construction on one side has been complete, the downstream wall of the exclosure shall be removed first, followed by the upstream end;
10. Repetition of the steps above on the opposite bank

Construction between Highway 101 and Canon Perdido Street:

11. No mechanized equipment permitted in water between December 15 and the end of March;
12. Prior to starting work in the next region upstream, a qualified biologist would examine all scour pools at bridge abutments, undercut concrete ledges, etc.;
13. Any steelhead, or young salmonid fish in particular, found unexpectedly in these small refuges would be relocated upstream to a receiving area previously identified and agreed upon by NMFS and CDFG and in a manner thoroughly consistent with appropriate transportation techniques. If authorized, the monitor shall weigh, measure, remove a sample of cheek scales, remove a sample of adipose fin, and apply a permanent identification tag of acceptable properties to each salmonid discovered and relocated;
14. The biological monitor shall prepare a written report giving all pertinent details of fish relocated;

15. Silt curtains shall be deployed below the immediate area of construction. Curtains would be deployed in pairs, with a gap at least 30 feet wide between the upstream and the downstream curtain to reduce suspended sediments in the water;
16. A temporary net of appropriate size as agreed upon by NMFS and CDFG shall be strung across the existing low flow channel to prevent salmonids from entering the section of creek next to be constructed;
17. Once certified free of protected fish, the existing current would be diverted to a temporary pilot channel shall be scored in the center of the creekbed;
18. As many culvert pipes as determined necessary to carry anticipated low flows shall be placed into the pilot channel. A mesh filter no larger than ½ inch square shall cover the intake. Culverts shall be at least 24 inches in diameter. Culverts shall not be longer than 100 yards;
19. Once culverts have been placed, the biologist shall monitor each section at least twice a week to verify that screens are in place over intakes and water has not leaked into the local section under construction;
20. Prior to completion of work in a given section, the temporary net shall be resuspended upstream of the culvert intake and fully across the existing low flow channel;
21. Only then shall removal of the culvert and completion of the natural streambed downstream be allowed;
22. The pair of silt curtains shall be removed;
23. The next upstream segment of creek bed and banks shall be readied in like manner.

8 Environmental Commitments to Minimize Recurrent Adverse Effects During Future Channel Maintenance

8.1 Routine Maintenance Upstream of the Oxbow

Above Highway 101, a biennial cycle of maintenance activities shall be instituted which incorporates a mosaic pattern of sediment removal from half the creek's bottom and mechanical brushing of vegetation in the other half each year, then repeating the process in the other half the following year. Debris reducing the channel's capacity would thus be removed from half of it in any given year. Mechanized equipment would be used in the creek bed to restore conveyance capacity, and the maintenance procedures would emphasize partial retention of aquatic habitat conditions (**Preliminary Design Plans, sheet 1, typical cross-sections**). Appropriate measures for:

Regular de-silting and brushing of vegetation in the creek bed —

24. All routine maintenance shall be accomplished between August and mid-October;
25. A pair of silt curtain fences shall be set across the low flow not more than 100 yards downstream of the work area;
26. the fences shall be approximately 10 yards apart;
27. A qualified biologist would examine all pools at bridge abutments for young salmonids;
28. Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and California Fish and Game and relocated promptly to a suitable refuge;

29. A written report describing in detail any such relocations would be submitted to National Marine Fisheries Service;
30. Mechanized equipment would enter the creek via the access way at the parking lot of the church at Canon Perdido Street, that at Cota Street, or that immediately adjacent to the oxbow;
31. A front end loader or road grader working together with dump trucks (10 yd^3) would be used for the bulk of sediment and vegetation removal;
32. A front end loader or road grader working together with dump trucks (10 yd^3) would be used for the bulk of sediment and vegetation removal;
33. A swath half the channel wide shall then be cleaned, first along one side as seems convenient for an arbitrary distance (say, 250 feet), then switching to the opposite bank for another arbitrary distance;
34. the pilot channel would routinely head toward and pass close to projecting ledges to keep water flowing in their general direction during the dry season;
35. vegetation in the other half shall be mowed to suppress the growth of woody perennials but still allow herbaceous perennials and annuals to grow;
36. If storm events of the next winter rains leave enough sediments to warrant their removal, then during the following summer the other half of the creek bed, that where only brushing of plants occurred the previous year, would be groomed to remove obstructing sediments and plants, and to shift the chamfer and the pilot channel to the opposite side;
37. If storm events do not reduce conveyance more than 15% then the next maintenance cycle shall involve only mowing of vegetation

for maintenance of side baffles, ledges, and mid-stream boulder clusters —

38. Sediments would be removed from among boulder clusters and large rocks of the side baffles only as needed to prevent them from being covered completely;
39. If necessary, sediments shall be dug from the downstream side of boulders with a backhoe equipped with a 3 foot bucket, then dragged toward the center of the creek to be combined with streambed sediments being removed as described previously;
40. any individual boulders that might have been dislodged mechanically or displaced by currents would be pushed back into a suitable vacant spot in the baffle and reset.
41. Any propagules of giant reed or salt cedar that have taken root shall be eliminated. A combination of foliar application of glyphosphate or digging out rhyzomes with hand tools could be employed. Application of herbicides should be very limited, confined to only those small locations where the most persistent and aggressive weedy plants begin to re-invade the creek bottom;
42. The remaining growth shall be cut back using a brush hog, or similar mowing attachment passed a couple feet over the tops of the rocks. The intent is to cut down woody species before they attain much height or stem expansion, but not to eradicate low-growing herbaceous plants that offer negligible friction to water currents.

8.2 Maintenance Expectations Between the Oxbow and Sandstone Channel

The weir's height would push all flows smaller than 640 ft^3/sec toward and through the sandstone channel. In effect, the pattern by which sediments currently settle in the sandstone channel would remain unchanged.

Removal of silts and vegetation between the Highway 101 bridge and through the sandstone channel would continue to follow current practices.

- Sediments and vegetation would be removed when channel capacity has been reduced by more than 15%;
- All routine maintenance shall be accomplished between August and mid-October;
- A qualified biologist would examine all pools at bridge abutments for young trout;
- Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and California Fish and Game and relocated promptly to a suitable refuge;
- A double line of straw bales or silt curtain shall be set across the lower end of the channel;
- A front-end loader would scoop all materials directly from the channel to trucks waiting above adjacent to the railroad tracks;
- The full width, 33 feet, would be cleaned of obstructive materials.

8.3 Maintenance expectations Within the Estuary

Projections of sediment transport indicate greater erosion from storm events than currently takes place. During storms, water entering the culvert would carry less sediment than it could by virtue of the blocking effect of the weir. When flows through the culvert and sandstone channel converge, this volume of cleaner water would resuspend fine sediments. Hence, the net effect of the project within the estuary should shift the composition of the streambed to gravels and small rocks, rather than fine silty sediments. Removal of silty materials or other fine sediments from anywhere in the estuary should not become a maintenance requirement of the project.

9 Documenting no permanent adverse effects

Steelhead belonging to the southern evolutionary population appear rather opportunistic in their migratory behavior, both in the number of individuals who make the ascent in any given year — in fact, years when none are seen anywhere in the creek are not uncommon — and the time of year when they enter the watershed. River flow seems to be the factor which most clearly prompts adults fish to try to reach spawning areas in southern California coastal streams. Since the quirks of winter storm patterns in this region cause quite unpredictable flow patterns from one year to the next, their migratory tendencies are controlled by this climatically irregular but annual phenomenon.

Confirmation of adult steelhead appearing in suitable pools and runs, mostly upstream of Rocky Nook and into the higher reaches of Mission Creek or Rattlesnake Creek, following winter rains would constitute evidence of proper aquatic conditions within the length of the proposed flood control project, and evidence that its design and maintenance did not degrade conditions essential to their migration toward spawning areas. However, allowing for climatic vagaries the

species cannot reasonably be expected to migrate the creek any more often after construction of this flood control project than it does now, an unpredictable occurrence in the best of times in this climate. Favorable weather patterns could cause steelhead to appear in upper reaches of the drainage the first winter after completion of the project. On the other hand, a lengthy sequence of winters drier than average might prevent steelhead from swimming up Mission Creek for reasons which have nothing to do with the proposed project. Negative evidence should be discounted from this criterion.

10. CONCLUSIONS

The Corps of Engineers analyzed thoroughly the potential for impacts to steelhead which implementation of the proposed flood control project could cause. The possible need to relocate steelhead out of harm's way during construction and future channel maintenance, in a manner supervised and approved by the National Marine Fisheries Service and the California Department of Fish and Game, would constitute an unavoidable impact. Recognizing that, the Corps developed all feasible measures of mitigation in coordination with NMFS and other concerned resource agencies. With implementation of these various environmental commitments and structural mitigation measures, the proposed flood control project would have only temporary impacts to steelhead adults or smolts.

The proposed action will result in temporary degradation of habitat at the estuary, but only during the summer and fall after adults have tried to swim upstream and any smolt would normally have made their descent to the ocean. The next time steelhead would pass upstream through the estuary, during the following rainy season on the migration to upper elevations, those temporary effects would have been overcome by the larger estuary and the assorted refugia to provide hideouts for fish. When completed, the proposed design would also involve boulder clusters designed to blunt stream velocities and produce many small pools and runs which steelhead would exploit while moving upstream, additional protective ledges and bouldery linings of the creek's walls. Within a few years, plantings of native trees and shrubs on the finished banks would shade much of the creek.

Water should move through this final portion of Mission Creek at lower velocities than occur presently because the creek bed would be both wider throughout and have a soft bottom of natural materials. Sediment deposition and erosion would differ only marginally from existing patterns. The substrate in the estuary should become coarser with more gravelly places than now.

The design of the weir to control water movement at the split between the existing watercourse through the oxbow channel and the proposed bypass culvert would avoid completely any adverse impacts to migration of steelhead. At the strong recommendation of NMFS during meticulous planning discussions with hydraulic engineers from both agencies, all discharges less than 640 ft^3/sec would pass through the oxbow by virtue of the weir's design. Functional properties of the bypass culvert thus would not be a hazard to steelhead adults or smolt.

Maintenance procedures of the finished stream channel would occur between late summer and early fall. Aside from the possible need to relocate smolt seeking summer refuges at scour pools adjacent to bridges, the mosaic pattern of annual channel maintenance should not affect steelhead in any way. Pools formed beneath fish ledges or among the boulder clusters during the rainy season would be left untouched during channel maintenance.

The design and implementation of this proposed flood control project can be accomplished with minimal adverse and temporary effects to steelhead. The Corps anticipates design features and structural mitigation features should actually improve the conditions for steelhead migration through the lower reach of Mission Creek.

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Letters asserting phenotypic resemblances between salmonids in the Mission Creek watershed in May 1995 and southern evolutionary unit steelhead.

URBAN CREEKS COUNCIL
Santa Barbara Chapter: 5771 Leeds Lane, Goleta, Ca 93117 (805) 964-3105

May 25, 1995

Pat Higgins
Fisheries Biologist
791 8th Street, Suite N
Arcata, CA 95521

RE: DOCUMENTATION OF SOUTHERN STEELHEAD / RAINBOW TROUT (ONCORHYNCHUS MYKISS) IN RATTLESNAKE CANYON CREEK, SANTA BARBARA COUNTY

Dear Pat:

As a follow up to our survey of Rattlesnake Canyon Creek on Monday, May 22, 1995, and our conversation regarding southern steelhead in the creek, Jose Romero and I returned to sample the stream on Wednesday, May 24.

METHODS:
We sampled the creek using angling gear that consisted of a barbless fly and a barbless single hooked spinning lure. Captured fish were photographed and returned to the creek immediately.

OBSERVATIONS:
Two fish were landed. One measured approximately seven inches and the other one was approximately 12" to 13" (see photographs). Please note that the larger fish was captured in the pool that you and Carl Paige described as having excellent overhanging banks for the species. The pool is located upstream from the first trail crossing. An attempt was made to take scale samples from the larger fish, but the attempt was unsuccessful and the fish was released in a stressed condition. This steelhead had a hooked lower jaw. The smaller fish was captured in a 5'-6' deep pool that has fallen trees approximately five feet above the water surface and is located several hundred yards upstream from the first trail crossing.

Additionally, two fish measuring an estimated 12" each were observed in a pool approximately 100 yards upstream from the site where the largest fish was captured. Approximately six fish in the 8" - 10" range were observed in the creek between Las Canoas Road and the second trail crossing (above where we stopped on May 22). Approximately one dozen fish in the 6" to 8" range were also observed in this reach of the stream. Many of these fish hit at the spinning lure but were not captured. There are fish in almost every sizeable pool, especially upstream from the first creek crossing of the trail.

Please contact me at (805) 964-3105 if you have any questions.

Sincerely,

Brian G. Trautwein

Brian G. Trautwein, Executive Director
Santa Barbara Urban Creeks Council

cc: Carl Page, Fisheries Biologist
Jeffrey Lincer, Sweetwater Biologists
Hayley Lovan, Army Corps of Engineers
Jan Hubble, City of Santa Barbara

SANTA BARBARA URBAN CREEKS COUNCIL

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June 28, 1995

Pat Higgins
Fisheries Biologist
791 8th Street, Suite N
Arcata, CA 95521

RE: DOCUMENTATION OF SOUTHERN STEELHEAD / RAINBOW TROUT (ONCORHYNCHUS MYKISS) IN RATTLESNAKE CANYON CREEK, SANTA BARBARA COUNTY

Dear Pat:

As a follow up to my May 25, 1995 letter to you, I am enclosing the photographs of the twelve to thirteen inch steelhead that Jose Romero and I documented in Rattlesnake Canyon Creek on May 24, 1995.

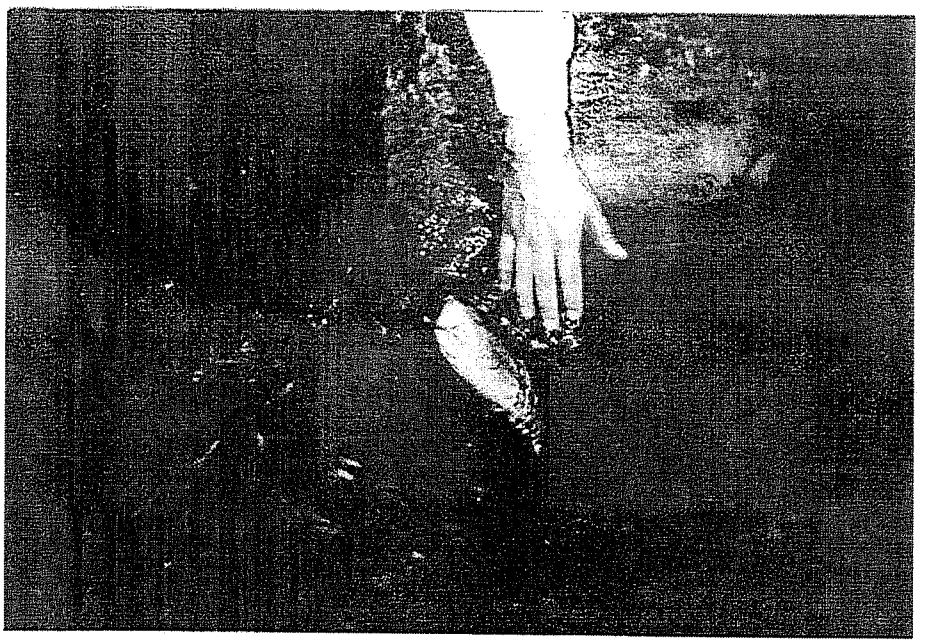
I expect Jennifer Neilson's genetic analysis of samples from Rattlesnake Canyon Creek to be completed soon. This should shed light on the origin of the fish in the creek, which is relevant to the flood control project proposed for Mission Creek downstream from Rattlesnake Canyon.

Sincerely,

Brian G. Trautwein

Brian G. Trautwein, Executive Director
Santa Barbara Urban Creeks Council

cc: Carl Page, Fisheries Biologist
Hayley Lovan, Army Corps of Engineers
Jan Hubble, City of Santa Barbara



Images scanned from original photographs which accompanied the letter of June 28, 1995.

APPENDIX - A-3

SHADE STUDY
LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

Penfield & Smith Engineers . Surveyors

FOR

CITY OF SANTA BARBARA

FEBRUARY 2000

Penfield & Smith
ENGINEERS • SURVEYORS

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W.O. 13216.01

February 25, 2000

Mr. Pat Kelly
City of Santa Barbara
Public Works Department
630 Garden Street
Santa Barbara, CA 93101

Subject: **Lower Mission Creek Shade Analysis**

Dear Pat:

This shade analysis was performed in response to questions regarding how much of the water in Lower Mission Creek would be shaded after completion of the project proposed by the Army Corps of Engineers. This analysis was conducted using a landscape design program entitled "Sierra Land Designer – 3D." The program provides an indication of the extent of shading and allows the modification of a number of variables that affect shade along a creek. The shade along the creek above and below the freeway was investigated.

The segment of creek below Chapala Street was analyzed in greater detail due to the concern that the widening of the creek to 60' would preclude shading of the creek with trees. The concern over shade in this area is increased due to the negative affect direct summer sun has on algae blooms in the ponded creek water and thus the production of undesirable odors. The shade analysis for the creek below Chapala Street also included a review of the extent of existing shade from trees and buildings.

The first section of this letter provides background information relative to the computer program and the approach used in this analysis. The second section reviews the results of the analysis and the third section summarizes the findings of this analysis.

The reader is cautioned to remember that this shade analysis software probably only provides a general qualitative perspective; however, field observations were made to confirm the reliability of the shade analysis program.

BACKGROUND

Sierra Land Designer – 3D allows the user to input various buildings, hardscapes, land forms and plants to create a three dimensional model of a landscaped area. This model can then be used to graphically depict shadows cast by plants. This model allows variation of the following parameters:

Compass orientation
Plant growth over time
Seasonal changes of plants
Longitude
Time of day

The program shows shadows cast by buildings, but not shadows cast by fences, walls or creek banks.

To simplify the analysis, two typical sections were modeled. The first section represents the creek upstream from the freeway and is based on a creek that has vegetated side slopes with short vertical walls. The distance between the walls was set at 42 feet. The second section represents the creek below the freeway and is based on a creek with vertical walls spaced 60 feet apart. This section assumes that some sycamore and willow trees will be planted by the community adjacent to the creek bank on private property. The typical section for the 42' foot wide creek shows a higher density of sycamore and willow trees than the section below Chapala Street. The typical sections are both shown with the creek flowing west to east (north south axis perpendicular to the creek). A typical residential neighborhood is shown in both sections to provide scale and perspective.

The model shows the sycamore trees to be approximately 20 to 30 feet tall after 5 to 10 years and growing to 50 to 60 feet tall after 20 to 30 years. The willow trees are shown to be 15 to 20 feet tall after 5 to 10 years and growing to 25 to 35 feet tall after 20 to 30 years. These tree sizes have been confirmed by biologists familiar with the growth of trees along creeks.

Information on existing shade was collected on February 24, 2000 at approximately 1 pm. A model run was produced for February and compared to actual shade levels to help confirm the reliability of the model.

RESULTS OF THE ANALYSIS

For the section above the freeway, a plan view is attached as Exhibit 1. The plan view is for trees that have grown 5 to 10 years. The view shows the extent of shade produced by these trees in July. Also provided are two 3-D pictures showing the size of the trees in 5 to 10 years (Exhibit 2) and the trees in 20 to 30 years (Exhibit 3). This analysis clearly indicates that the proposed planting of sycamore and willow trees will completely shade

the 42 foot wide creek within 5 to 10 years. For this reason, no further analysis was performed relative to the shadows cast along the creek upstream from the freeway.

The remainder of the analysis is concerned with shades cast on Mission Creek downstream from Chapala Street where the creek is proposed to be 60 feet wide.

As mentioned above, the segment of creek below Chapala Street was analyzed in greater detail due to the concern that widening of the creek to 60' would preclude shading of the creek with trees. The concern over shade in this area is increased due to the negative affect direct summer sun has on algae blooms in the ponded creek water and thus the potential production of undesirable odors. The water sitting in this section of creek results from the tidal influence and the ponding resulting from the sandbar that regularly blocks the flow of water from the creek to the ocean. The shade analysis for the creek below Chapala Street also included a review of the extent of existing shade from trees and buildings adjacent to the creek.

Exhibit 4 shows the 60-foot wide creek with vertical walls. The trees are shown 5 to 10 years old with the shadows as cast in July at approximately noon. This exhibit indicates that approximately 15 to 20 percent of the creek would be shaded when the sun is highest in the sky. Exhibit 5 shows these same trees in a perspective view. Over time, these trees will grow and produce increased levels of shade. Exhibit 6 shows the shade that can be expected from sycamore trees after 20 to 30 years. This exhibit indicates that approximately 70 to 80 percent of the creek would be shaded when the sun is highest in the sky. The perspective view of these trees is depicted in Exhibit 7.

Two more models were run for the 60-foot channel. These two models were for February at noon so that existing shade conditions could be compared to the model predictions. The model indicates in Exhibit 8 (60' LMC Feb. Noon @ 5 to 10 years) that an object 20 to 30 feet tall will cast a shadow approximately 50 feet across the creek. This was confirmed by field observations of the shadows cast by existing trees and buildings. Exhibit 9 shows the shadows produced in February at noon by sycamore trees that are 50 to 60 feet tall (20 to 30 years old). These shadows were confirmed by the shadows cast by the existing multi-trunk sycamore tree downstream from the Mason Street Bridge. This large sycamore cast shadows that extended more than 70 feet from its base. This tree is estimated to be 50 to 60 feet tall even after being topped in the recent past (probably topped due to concerns over the stability of the tree with the creek erosion occurring at its base).

Existing shade conditions can be seen in the 14 photos included in Exhibit 10. These photos show that the only shade on the creek from Cabrillo to almost Mason Street, is from the walls, buildings and bushes along the creek. The planting of fast-growing riparian sycamore trees would quickly add shade to this section of creek. This shade would increase over time as shown in Exhibits 4 through 9. The section of creek at Mason Street is currently well shaded by the giant sycamore tree just downstream of the Mason Street Bridge. The project as currently proposed includes preservation of this tree

which would continue to shade the widened creek. The first 200 feet of creek upstream from the Mason Street Bridge has shade from buildings only. The planting of sycamore trees in this area will greatly enhance the shading of the widened creek.

The next section of creek up to the Chapala Street Bridge is almost completely shaded at this time by non-native trees and the invasive giant reed (Arrundo). The trees on the south side of the creek will be preserved with the project and will continue to shade the creek. The invasive giant reed will be removed as a part of the project and replaced with native willow and sycamore trees. At first this change will result in a decrease in shade on the creek; however, over time the fast-growing sycamore and willow trees will provide significant shade to this section of creek as depicted in Exhibits 4 through 9.

SUMMARY OF FINDINGS

The application of a fairly simple shading model clearly indicates that the 42-foot wide creek with vegetated side slopes and short wall will be quickly and completely shaded by the fast growing native willow and sycamore trees. The comparison of the results of this model with the existing conditions indicates that the shading of the creek from Cabrillo to Chapala will be improved overall with native willow and sycamore trees planted along the widened creek.

As stated earlier in this letter, this analysis only provides an indication of the level of shading that can be expected in the years following the implementation of the proposed project. The results of the computer analysis were confirmed by field observations along the creek.

Please contact me if you have any questions about this analysis.

Sincerely,

PENFIELD & SMITH

Bruce Burnworth
Principal Engineer

Attachments: Exhibits 1 through 10

c: Jan Hubbell
Tom Fayram

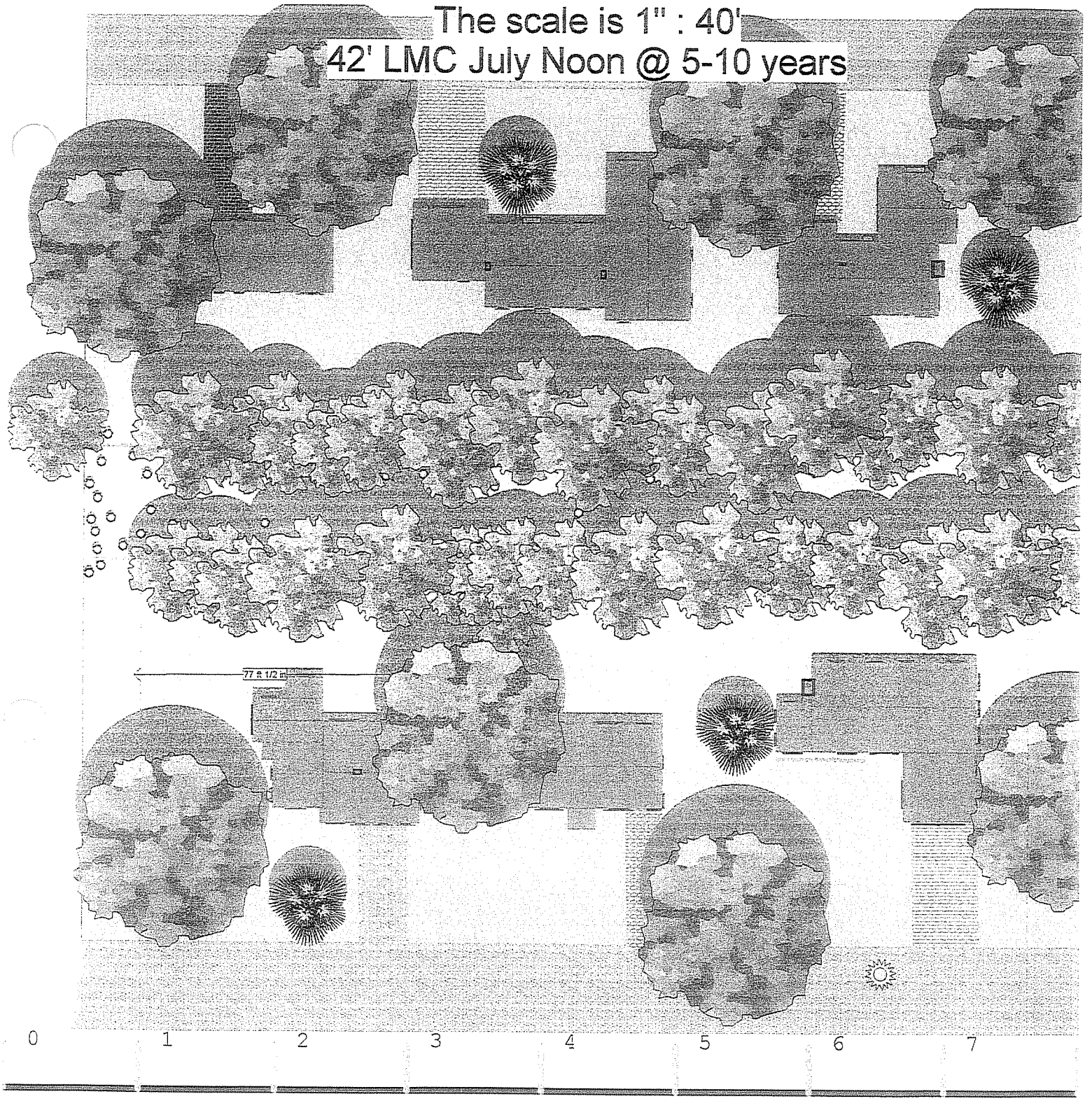


EXHIBIT 1
42' LMC July Noon
@ 5 to 10 Years

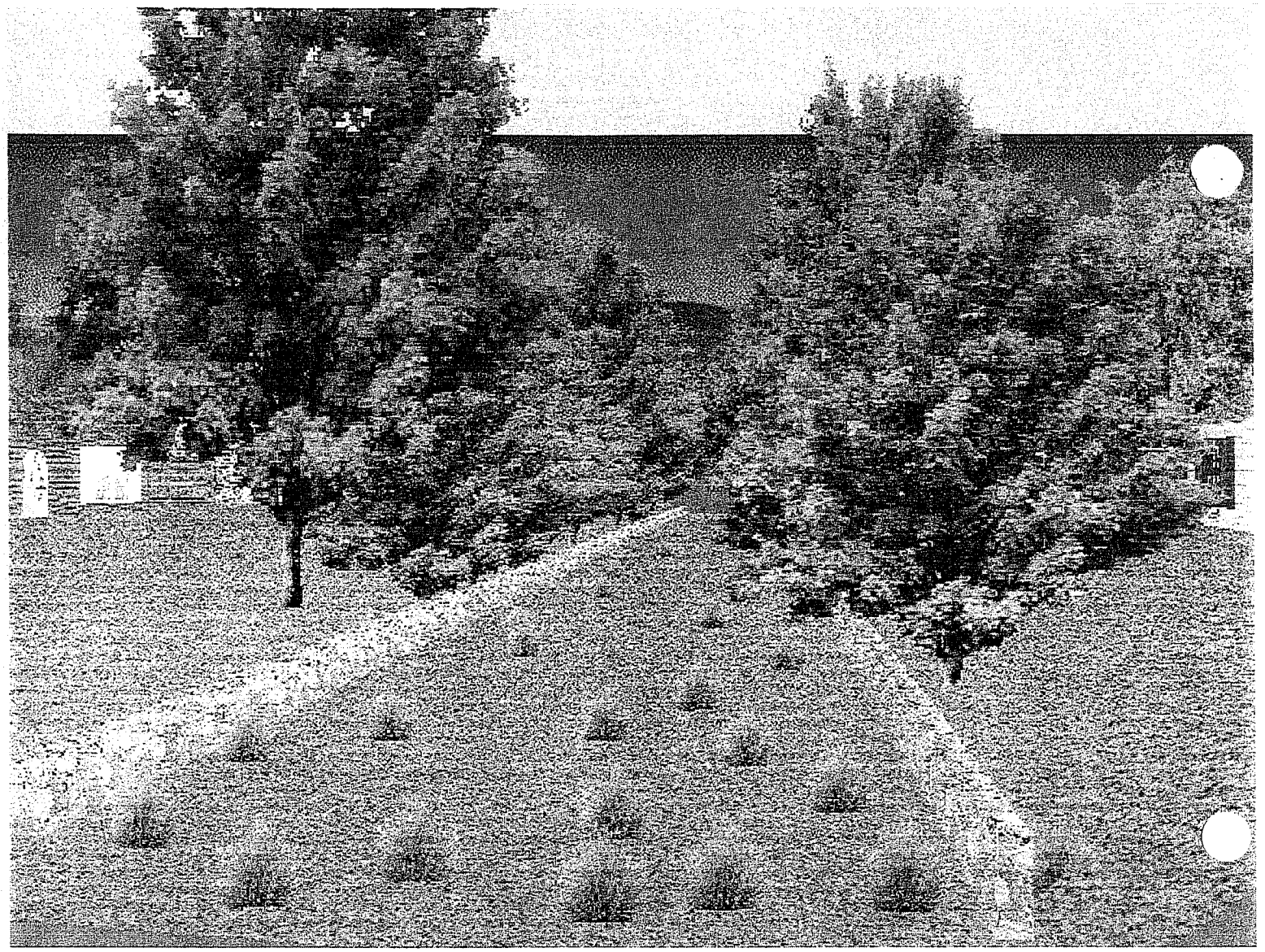


EXHIBIT 2
42' LMC Perspective View of Creek
@ 5 to 10 Years

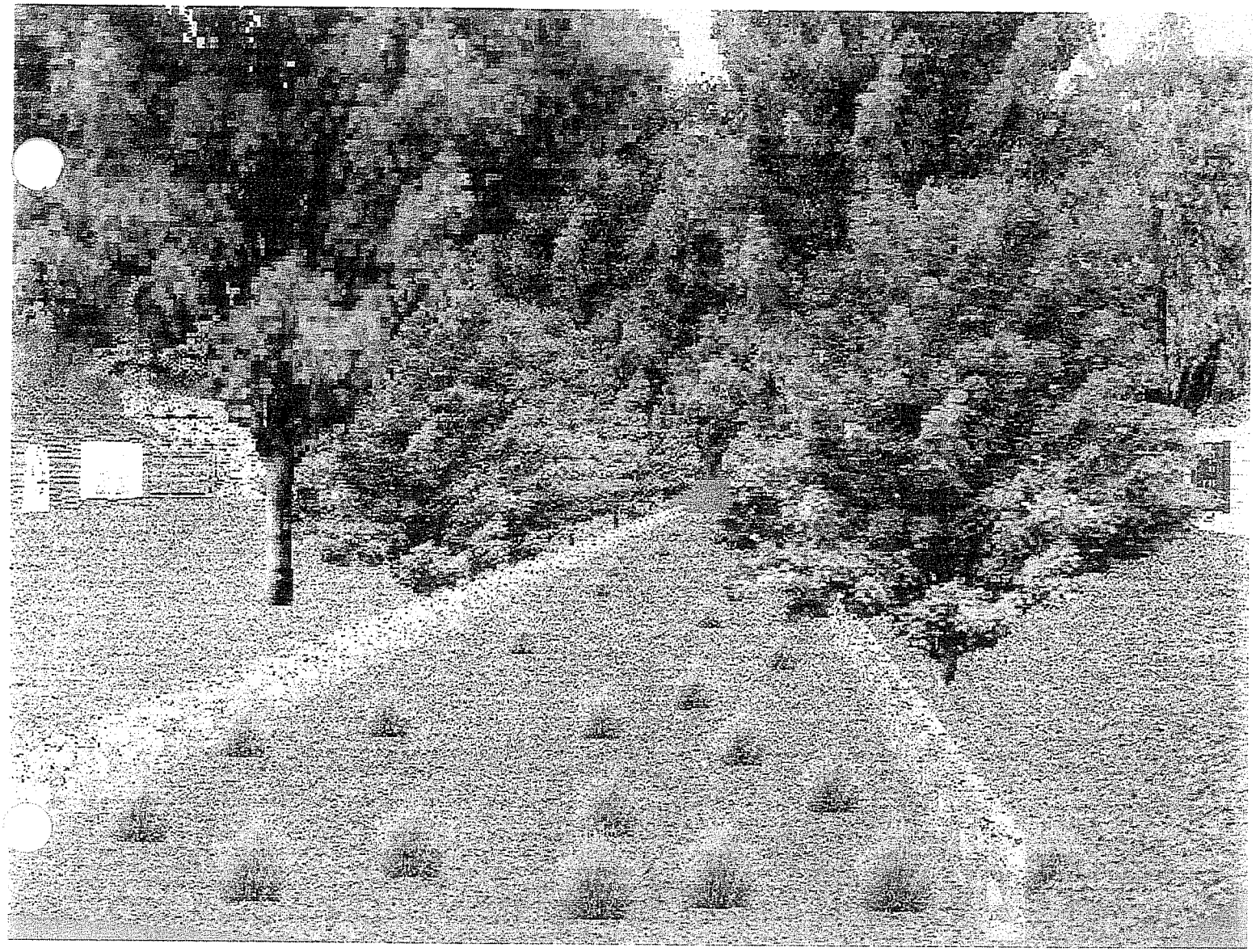


EXHIBIT 3
42' LMC Perspective View of Creek
@ 20 to 30 Years

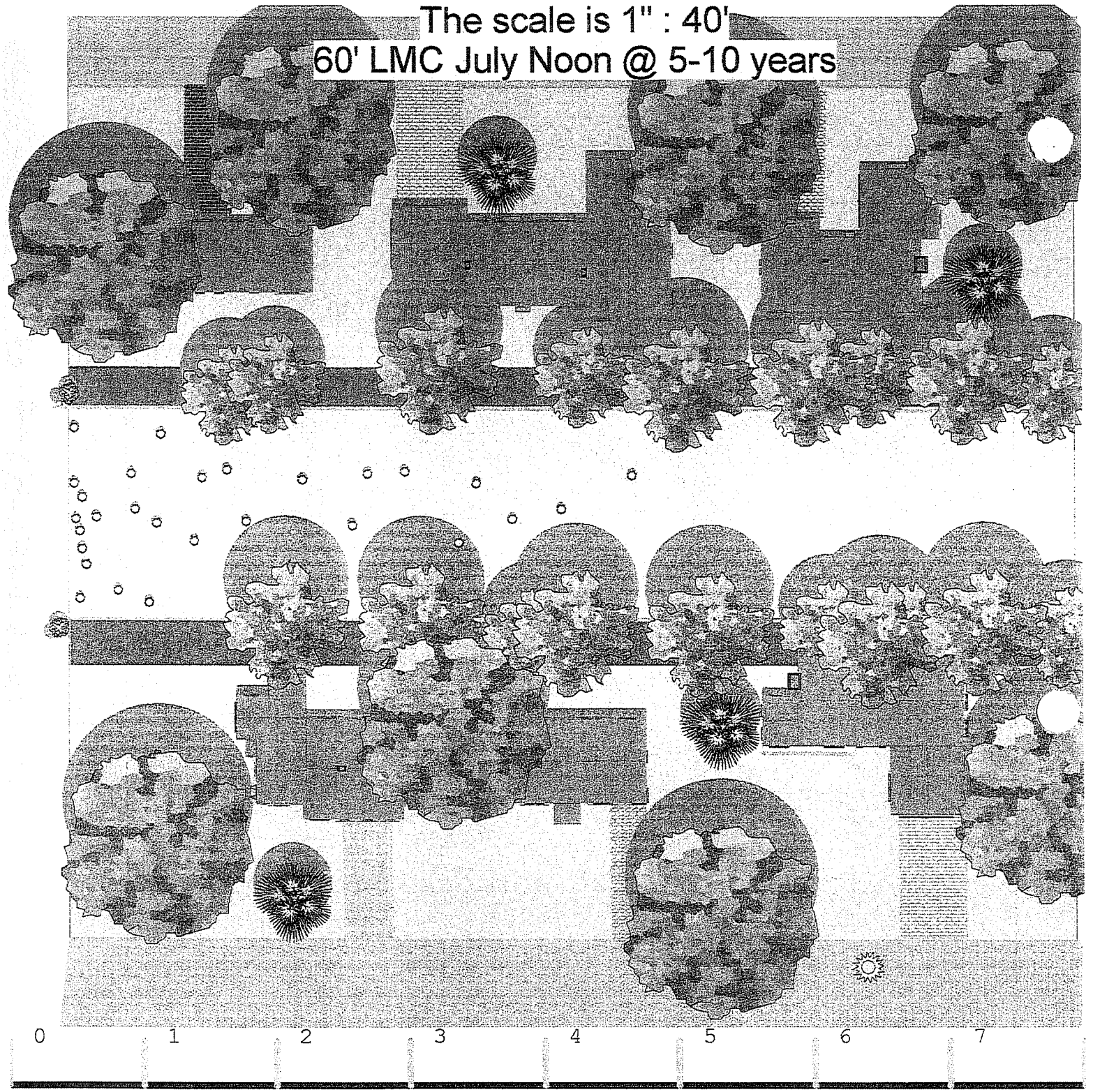


EXHIBIT 4
60' LMC July Noon
@ 5 to 10 Years

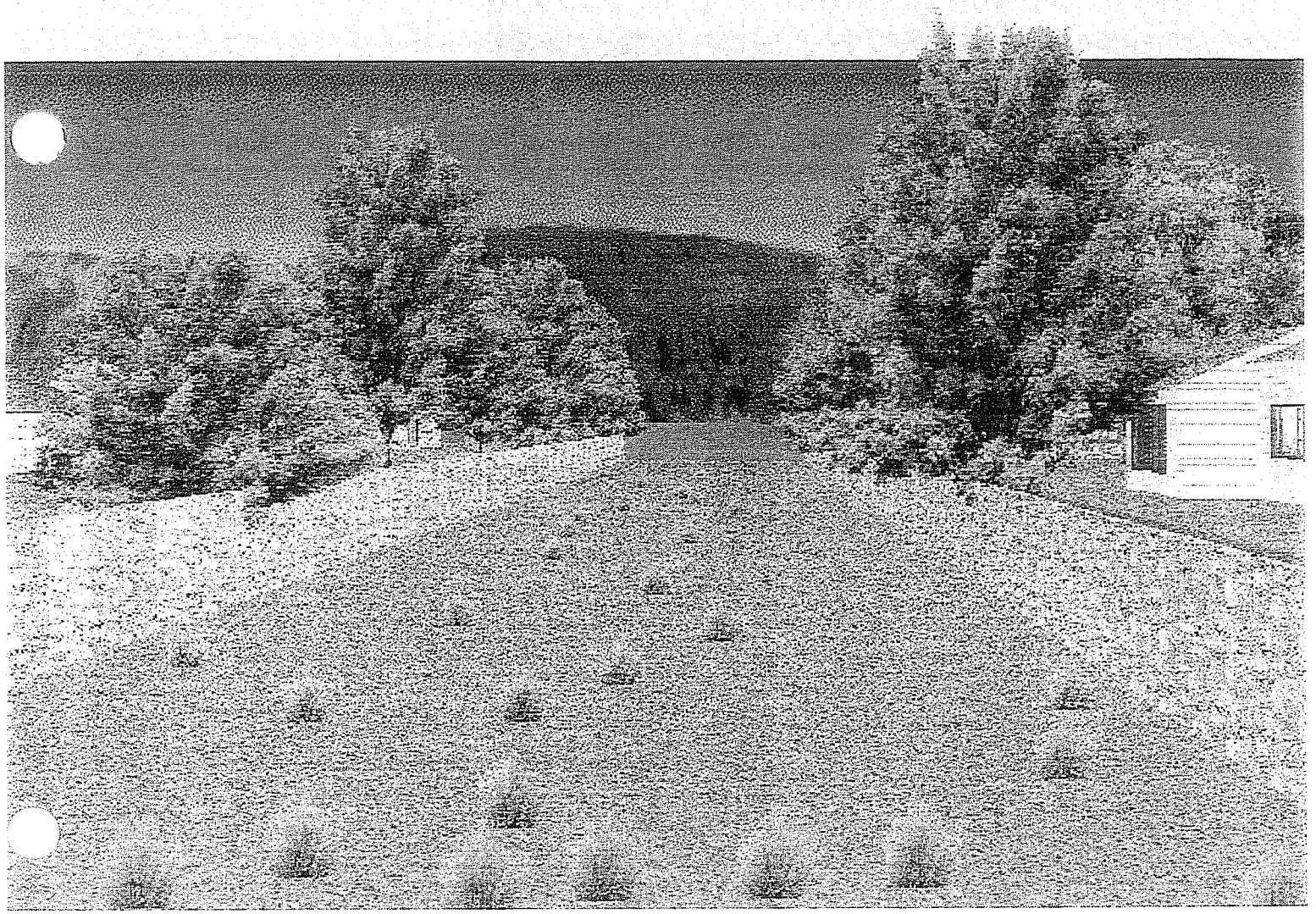


EXHIBIT 5
60' LMC July Noon
@ 20 to 30 Years

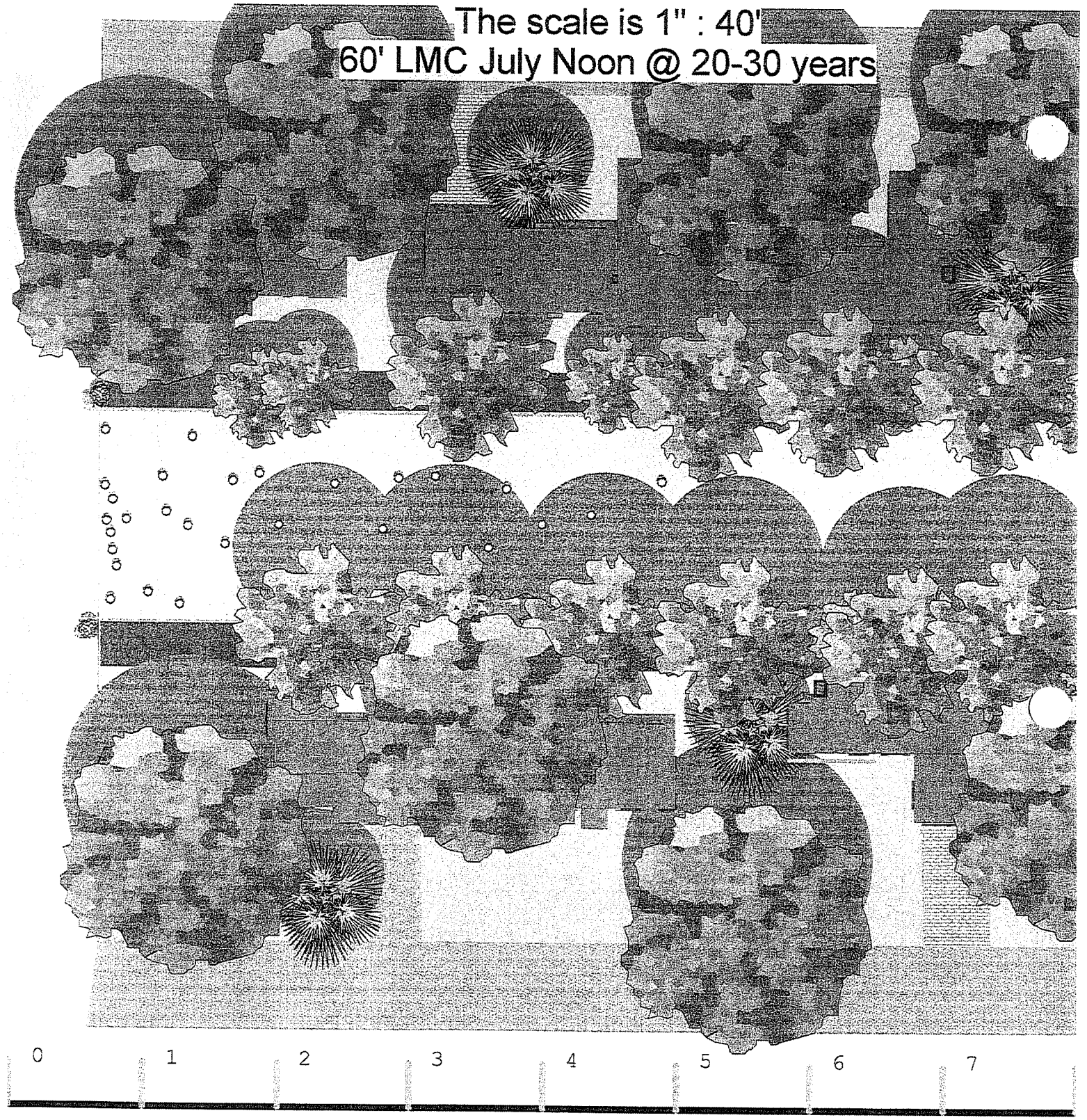


EXHIBIT 6
60' LMC July Noon
@ 20 to 30 Years

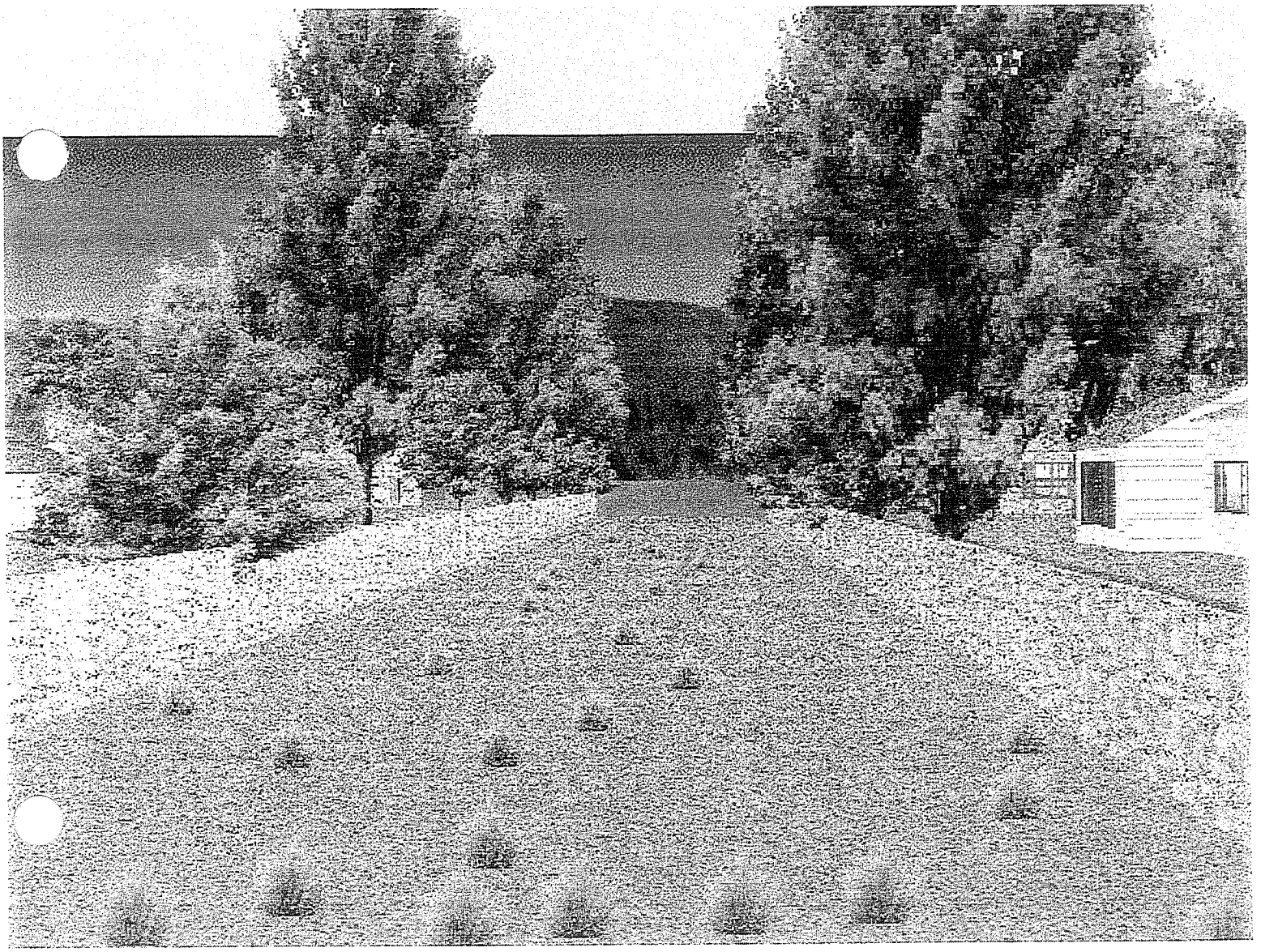


EXHIBIT 7
60' LMC Perspective View of Creek
@ 20 to 30 Years

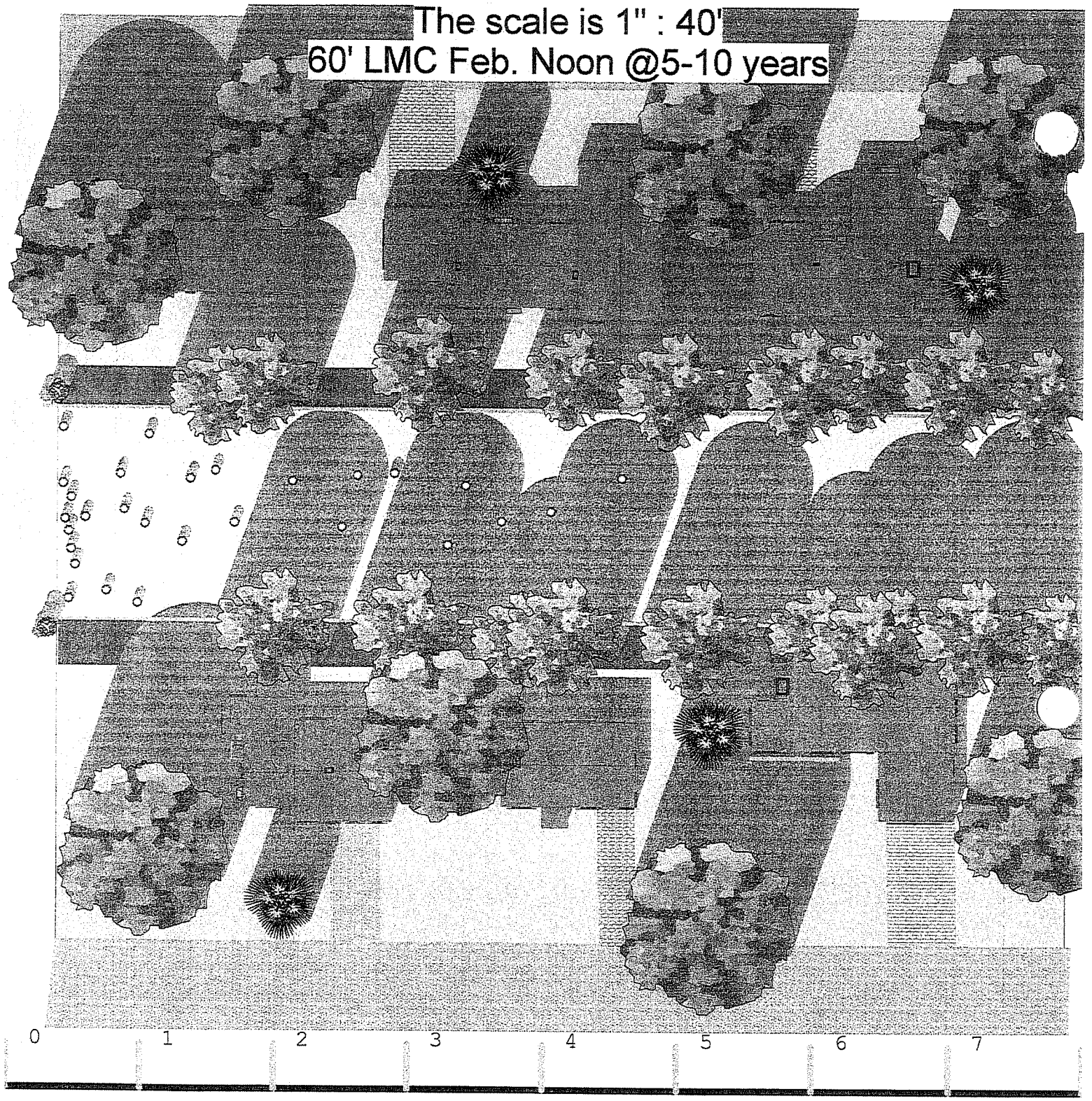


EXHIBIT 8
60' LMC Feb. Noon
@ 5 to 10 Years

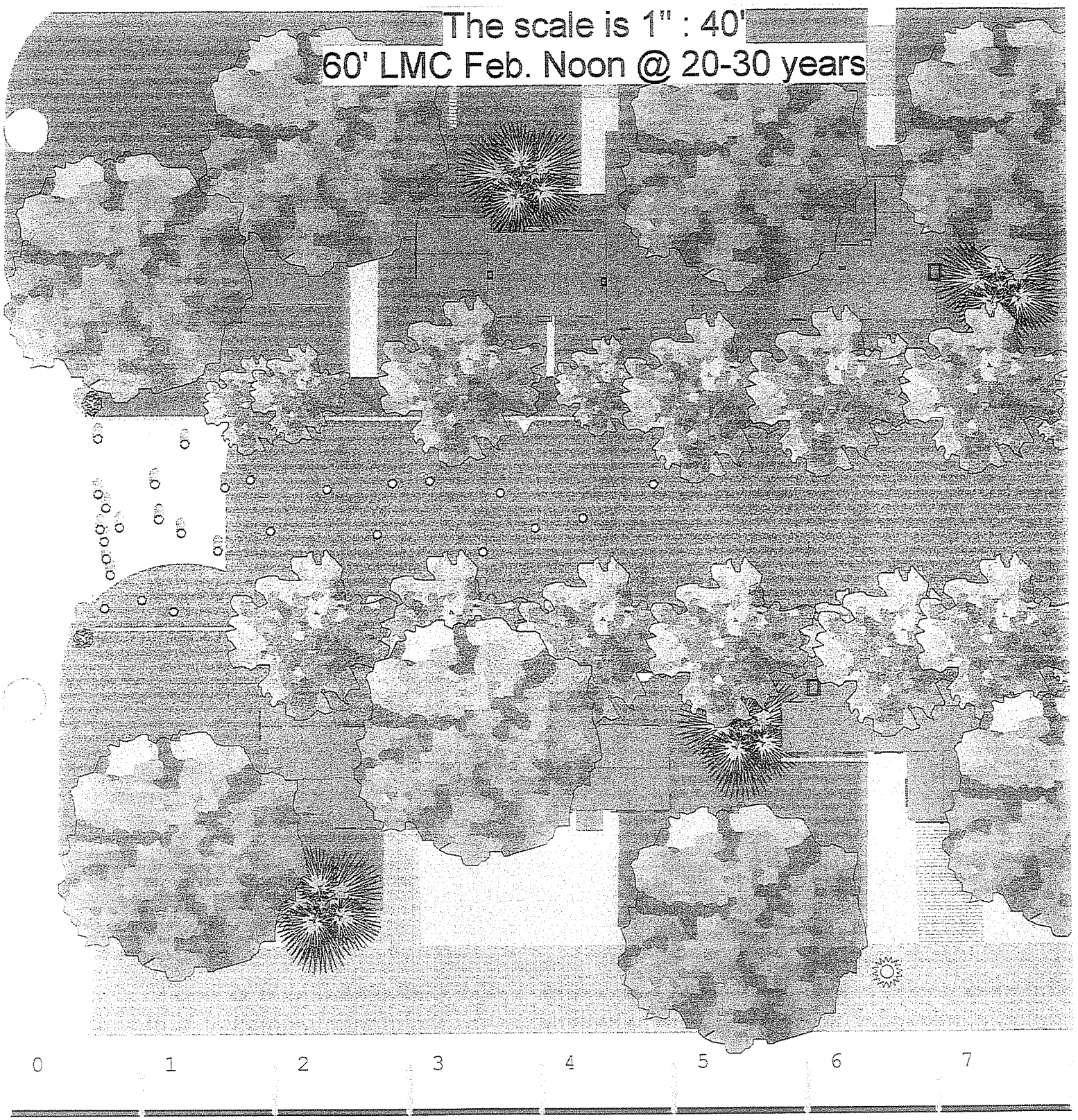
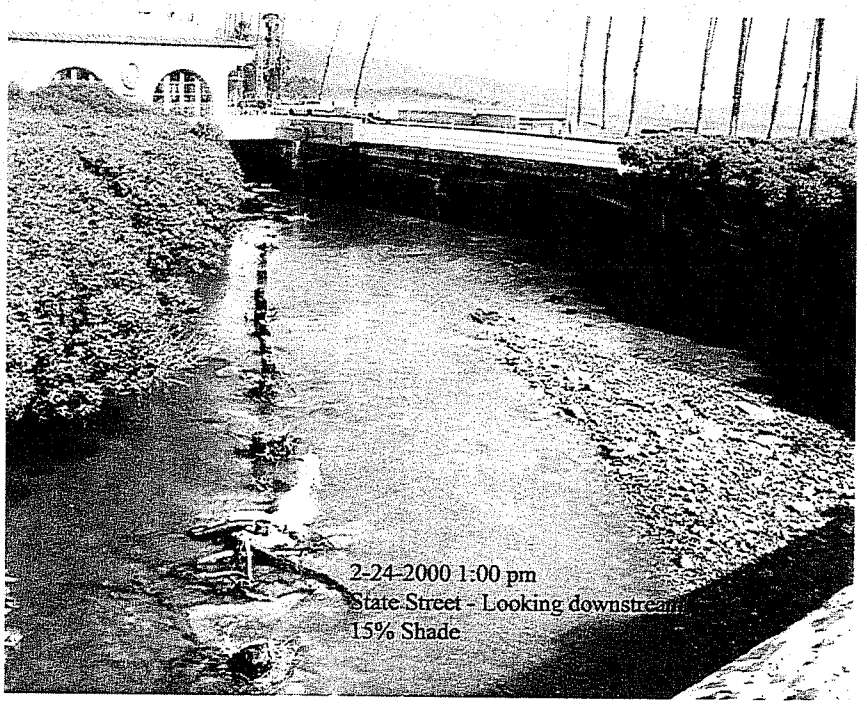


EXHIBIT 9
60' LMC Feb Noon
@ 20 to 30 Years



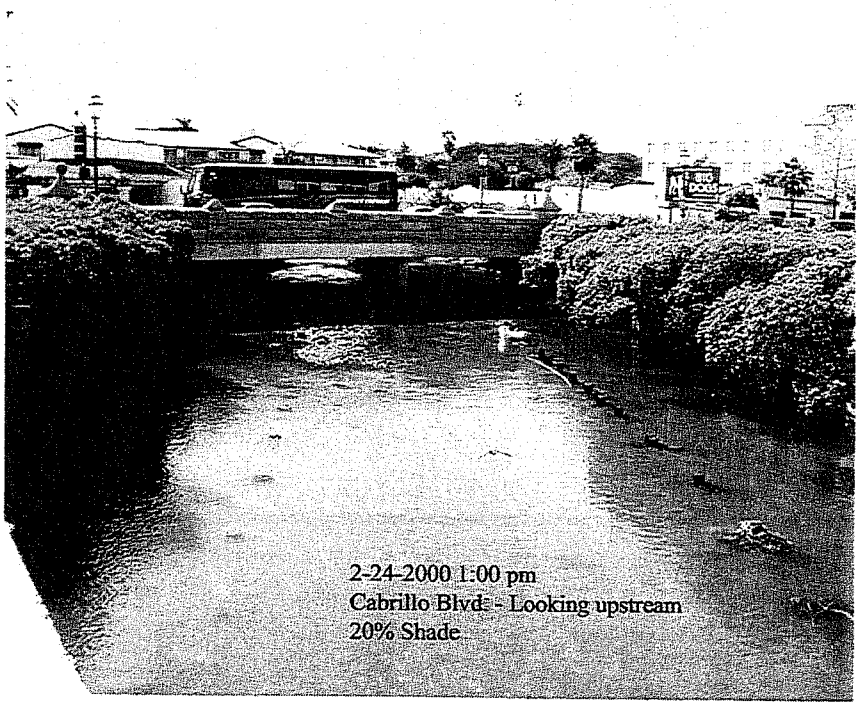
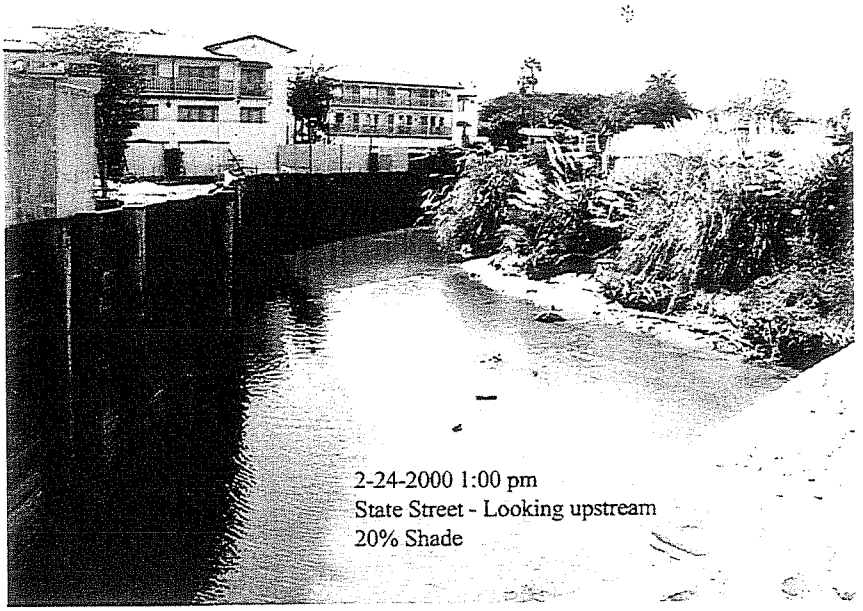
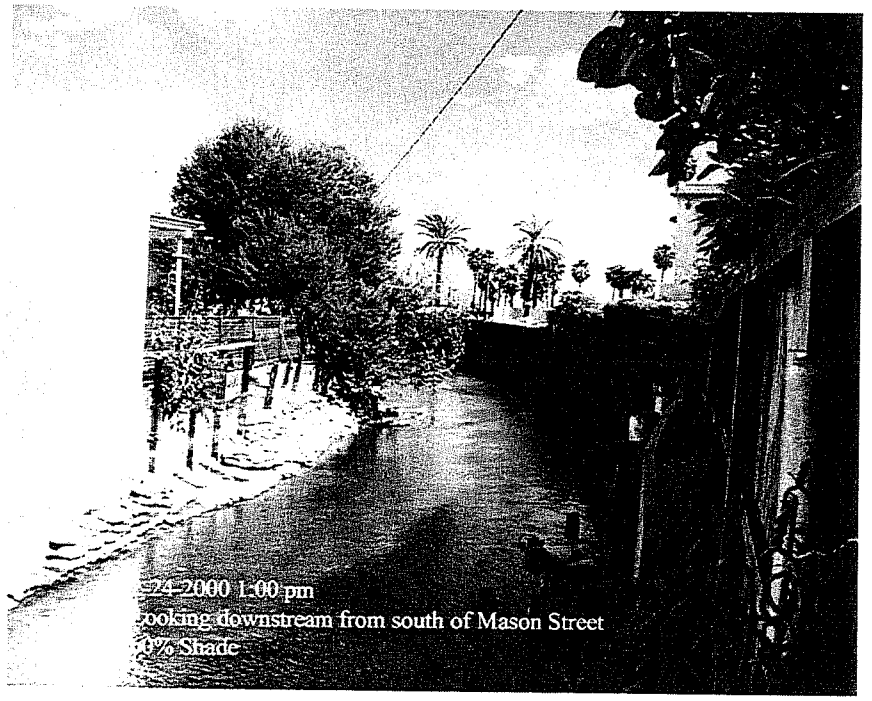


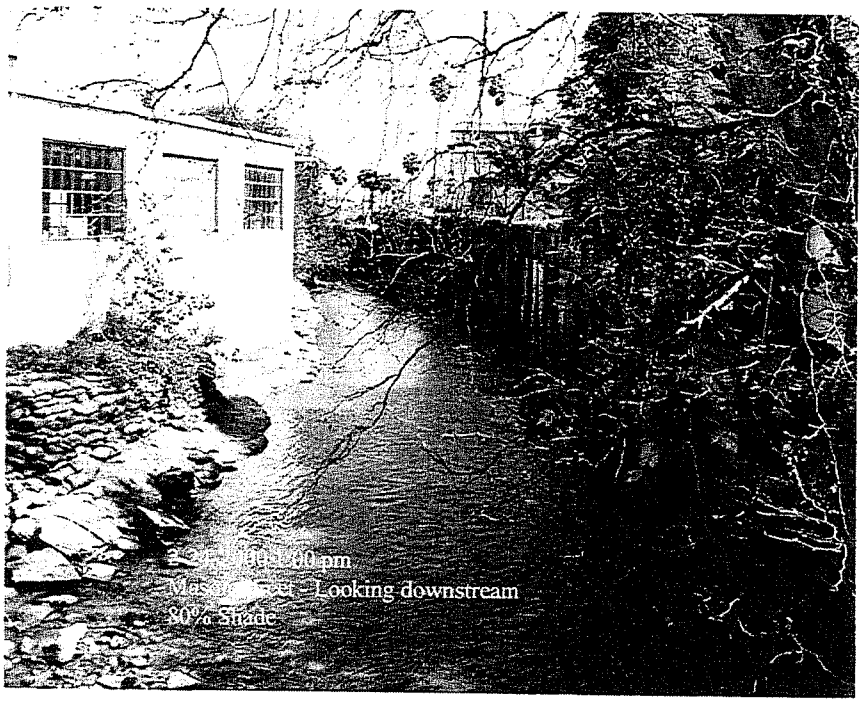
EXHIBIT 10
Existing LMC Feb. Noon
(Cabrillo to Chapala)

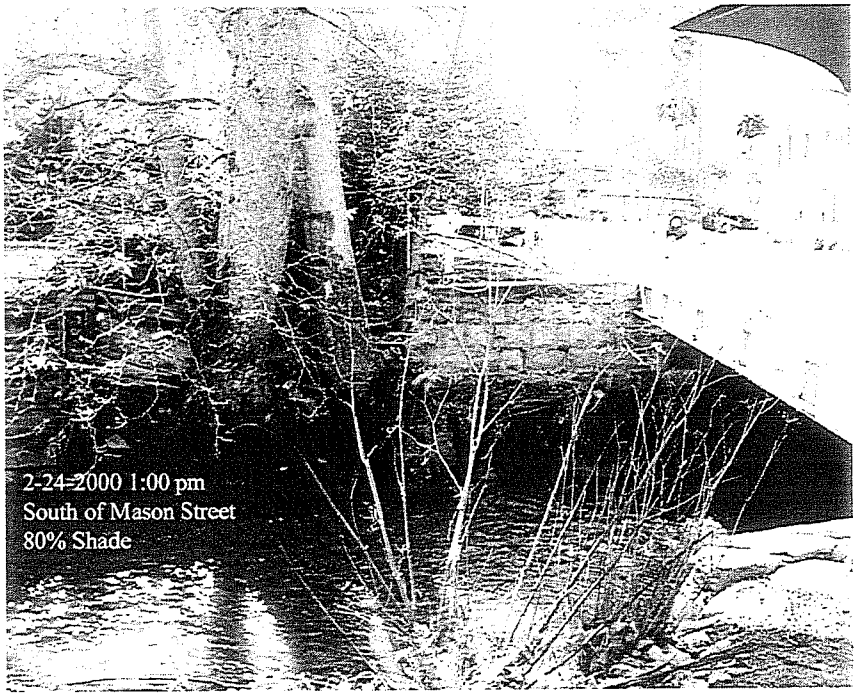


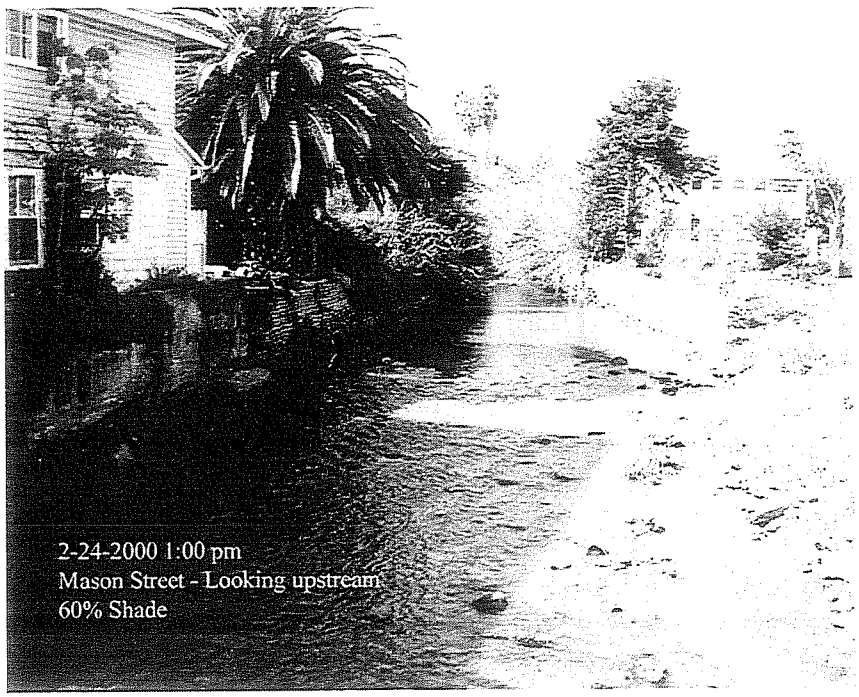
2-24-2000 1:00 pm
State Street - Looking upstream
20% Shade

2-24-2000 1:00 pm
Looking downstream to State Street
20% Shade

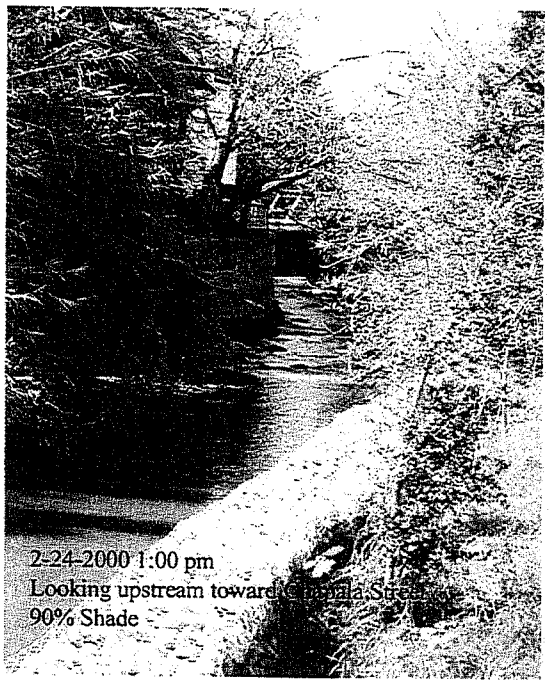

24-2000 1:00 pm
ooking downstream from south of Mason Street
0% Shade

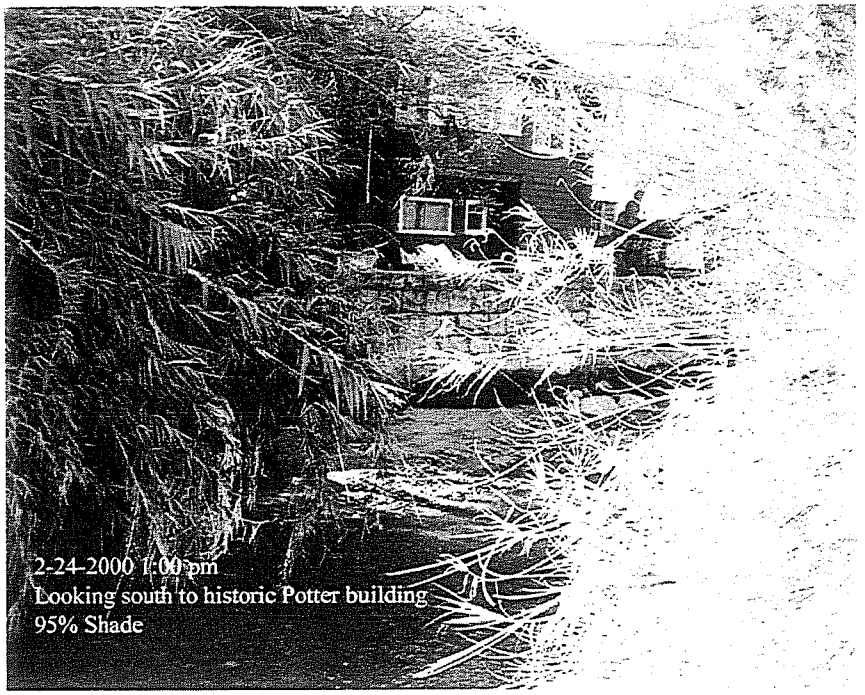

Looking downstream
80% Shade

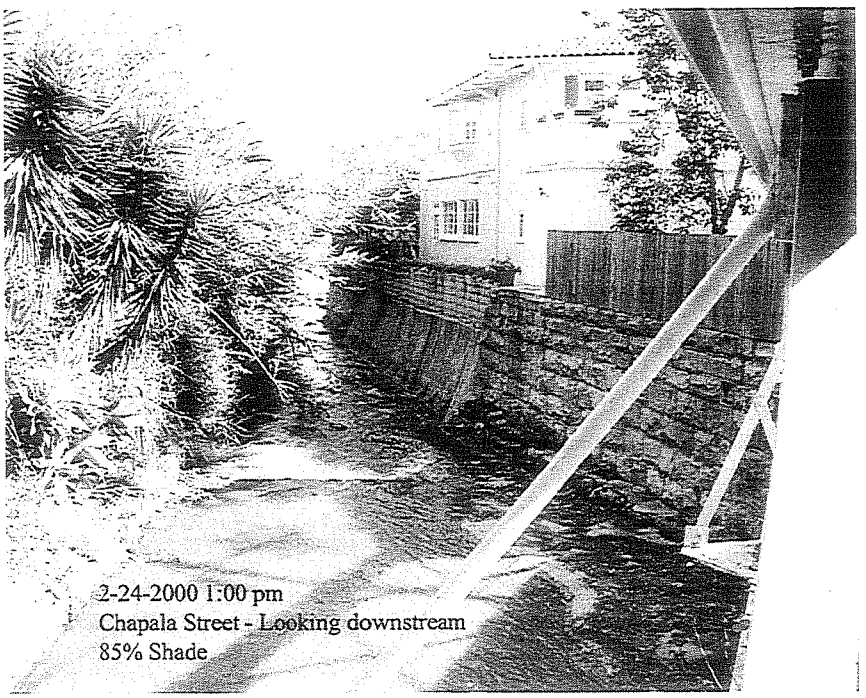

2-24-2000 1:00 pm
South of Mason Street
80% Shade

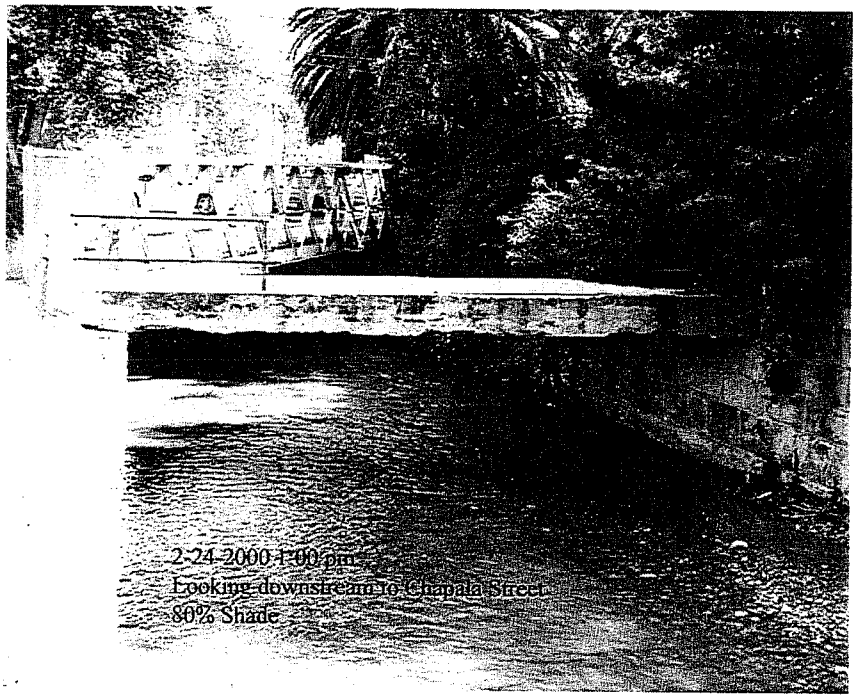

2-24-2000 1:00 pm
Mason Street - Looking upstream
60% Shade

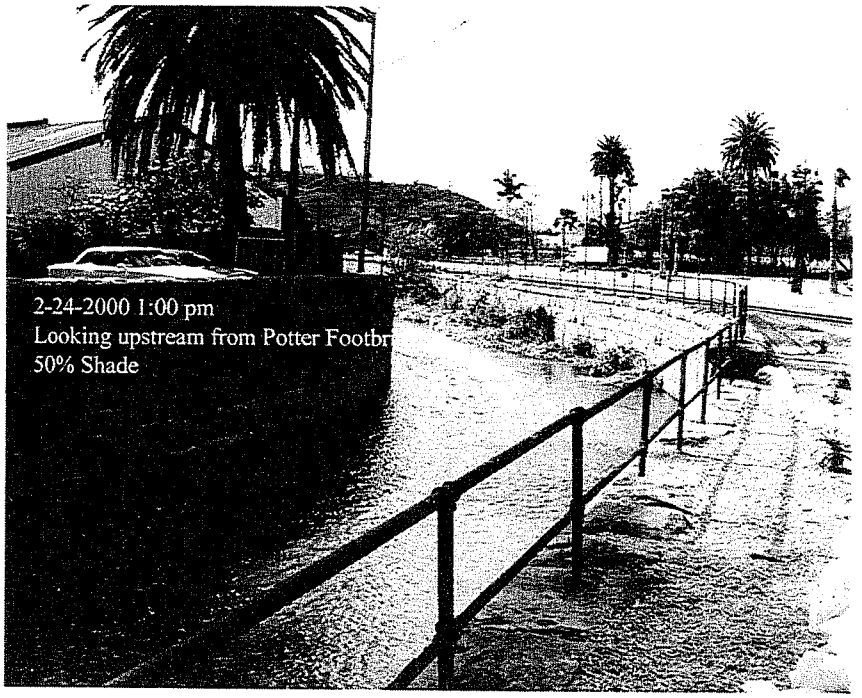
2-24-2000 1:00 pm
Looking downstream to Mason Street
70% Sh


2-24-2000 1:00 pm
Looking upstream toward Chapala Stre
90% Shade


2-24-2000 1:00 pm
Looking south to historic Potter building
95% Shade


2-24-2000 1:00 pm
Chapala Street - Looking downstream
85% Shade


2-24-2000 1:00 pm
Looking downstream to Chapala Street
80% Shade


2-24-2000 1:00 pm
Looking upstream from Potter Footbr
50% Shade

APPENDIX - B

U.S. FISH AND WILDLIFE SERVICE PLANNING AID LETTERS

LOWER MISSION CREEK FLOOD CONTROL PROJECT SANTA BARBARA, CALIFORNIA

PREPARED BY
U.S. FISH AND WILDLIFE SERVICE
VENTURA FISH AND WILDLIFE OFFICE
VENTURA, CALIFORNIA

Note: This package includes Planning Aid Letter dated March 26, 1997. Which was provided for old plan.

PLANNING AID LETTER

Lower Mission Creek
Reconnaissance Flood Control Study
Santa Barbara County, California

prepared by

US Fish and Wildlife Service
Ventura Field Office

prepared for

Corps of Engineers, Los Angeles District
Planning Division, Water Resources Branch

March 1997

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Field Office
2493 Portola Road, Suite B
Ventura, California 93003

March 26, 1997

Robert S. Joe
Chief, Planning Division
ATTN: Ms. Haley Lovan
U.S. Army Corps of Engineers
P.O. Box 2711
Los Angeles, California 90053-2325

Subject: Final Planning Aid Letter, Lower Mission Creek Reconnaissance Flood Control Study, Santa Barbara County, California

Dear Mr. Joe:

Enclosed is the final Planning Aid Letter by U.S. Fish and Wildlife Service (Service) for the Lower Mission Creek Reconnaissance Flood Control Study. This work product is provided under Order for Reimbursable Services number E86-95-0077 and the Scope of Work dated August 31, 1995.

The Service may be able to assist the U.S. Army Corps of Engineers with preparation of any Environmental Impact Statement or other future planning efforts at Lower Mission Creek in Santa Barbara. As described in the enclosed Planning Aid Letter, the study area affords many opportunities for flood control to be integrated with environmental restoration activities.

If you have any questions regarding this correspondence or the enclosure, please contact David Pritchett of my staff at (805) 644-1766.

Sincerely,

for Diane K. Noda
Field Supervisor

Enclosure

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INTRODUCTION

This Planning Aid Letter contains the preliminary analysis by US Fish and Wildlife Service (Service) for the Lower Mission Creek Reconnaissance Flood Control Study (Corps of Engineers 1995). This letter has been prepared in accordance with provisions of the Fish and Wildlife Coordination Act (FWCA) (48 Stat. 401, as amended; 16 U.S.C. 661 et Seq.) and other authorities. The scope of work for this Planning Aid Letter is described in the Corps of Engineers Fiscal Year 1996 Order no. E86 95 0077. This Planning Aid Letter is for technical assistance only and does not constitute the reporting requirement by the Service under FWCA Section 2(b). Findings by the Service are based on information obtained from previous reports and publications of the study area, and knowledge of the study area by Service staff involved in preparation of this Planning Aid Letter.

STUDY LOCATION

A flood control project for Lower Mission Creek is proposed for a 1.2 mile portion of the creek from Canon Perdido Street to the ocean. This reach of Mission Creek flows southeast, and is located within City of Santa Barbara. The Mission Creek drainage, the largest of several coastal stream systems in the Santa Barbara area, originates in the Santa Ynez Mountains in Los Padres National Forest, north of the city.

The Mission Creek drainage with tributaries is approximately 11.5 square miles in area (US Fish and Wildlife Service 1986). The headwaters of Mission Creek and its major tributary, Rattlesnake Creek, occur in the Santa Ynez Mountains at approximate elevation 3500 feet. The two creeks converge immediately south of Santa Barbara Botanic Garden. Mission Creek subsequently flows south and southwest until it approaches US Highway 101, at which point the creek curves southeast and flows several more miles to the ocean.

STUDY DESCRIPTION

As documented by Corps of Engineers, Los Angeles District (Corps), Lower Mission Creek has a history of flooding problems in residential, commercial, industrial, and public properties. Flood control alternatives being explored by the Corps include bank stabilization using various slope grades for the streambank, water diversion away from the stream channel, and opportunities for environmental restoration activities intermixed with the streambank stabilization work.

For a project previously planned by the Corps in 1986, the Service prepared a Fish and Wildlife Coordination Act Report for the Feasibility Report and Environmental Impact Statement (EIS) prepared by the Corps. From this work in 1986, the Corps selected the Carrillo Outlet Plan as the preferred alternative. Because of the lapse of time between the feasibility stage and the current preconstruction engineering and design stage of the project, a supplemental Environmental Impact Statement was prepared in 1994 to update environmental issues associated with the project. The Carrillo Outlet Plan is no longer the preferred project alternative.

A supplemental Coordination Act Report also was prepared in 1994 for the supplemental EIS, and this report was included in the Reconnaissance Flood Control Study prepared by the Corps in November 1995. The 1995 reconnaissance study focuses on alternative solutions, including a semi-natural, soft-bottom channel design of particular interest to the City and local residents.

DESCRIPTION OF EXISTING BIOLOGICAL RESOURCES

The condition of the natural resources varies along the length of the drainage. In its upper reaches, Mission Creek flows through steep terrain. Vegetation of the upper drainage is relatively undisturbed north of Santa Barbara Botanic Garden. On this portion, riparian woodland vegetation occurs along the creek and its tributaries, and the surrounding vegetation includes chaparral and coast live oak woodland plant communities (US Fish and Wildlife Service 1986). South of Santa Barbara Botanic Garden, the terrain becomes flatter, and the creek corridor is disturbed as a result of the

adjacent commercial and residential development within the City. A detailed description of existing biological resources is provided in previous work products by the Service (US Fish and Wildlife Service 1986, US Fish and Wildlife Service 1994).

Although the condition of portions of the drainage are not pristine, the drainage as a whole is an important riparian system for the area. Santa Barbara County has designated Mission Creek and its main tributary, Rattlesnake Creek, as prime examples of freshwater streams in the County. This designation indicates that these creeks deserve special protection because they support extensive areas of intact riparian vegetation with high wildlife habitat value.

Vegetation and Wetlands

The vegetation in the study area is comprised mainly of ruderal and ornamental species with only remnants of native riparian and estuarine plant communities. A total of 29 plant species were observed by Service biologists within the study area on September 20, 1993. Of these, 19 are exotic species. No federally listed or otherwise rare plant species were observed, nor are expected to occur in the immediate vicinity of Lower Mission Creek. The canopy of the project area is patchy in coverage, and includes scattered native willows (*Salix lasiolepis* and *S. lasiandra*), several mature sycamores (*Platanus racemosa*), and several exotic woody species. Shrubby and herbaceous vegetation is dominated by exotic species, including castor bean (*Ricinus communis*) on the creek banks and water evening primrose (*Ludwigia peploides*) on muddy substrate.

In a 1986 vegetation survey of the whole drainage area, 222 plant species were identified (US Fish and Wildlife Service 1986, US Fish and Wildlife Service 1994). The difference in plant species diversity between the whole drainage area compared with the study area can be attributed to the high level of disturbance occurring in the study area relative to the whole drainage. Urban development and associated vegetation management practices (e.g., residential landscaping) encroach up to the creek channel throughout the study area. In addition, human activities within the channel include rubbish dumping and haphazard installation of bank stabilization structures. The proximity of urban development and the human activities in and around the creek significantly have altered the native plant community within the study area.

The mouth of Mission Creek is blocked periodically by sand, hence forming a lagoon and estuary between Mason Street and the ocean. Ponded water typically backs up to the bridge at Mason Street. This estuary has only remnants of its natural plant community, with pickleweed (*Salicornia virginica*), saltgrass (*Distichlis spicata*) and bulrush (*Scirpus* sp.) scattered along the banks. Most all of the remaining vegetation in the estuary is comprised of exotic plant species.

As identified in the previous Coordination Act Report (US Fish and Wildlife Service 1994), the Service designates wetland habitats of Lower Mission Creek as Resource Category 2. This designation is based on the relative scarcity of riparian habitats in the area due to continuing and historic loss of riparian habitats and their high value to wildlife.

Amphibians and Reptiles

For the entire Mission Creek drainage, observations of 17 reptile species and 9 amphibian species have been recorded (US Fish and Wildlife Service 1986). Seven of these species are riparian dependent. The others can occur in uplands and in areas with less moisture. Only those species that are most disturbance tolerant are expected to occur in the study area.

The only rare species recorded for the Mission Creek drainage are the federally threatened California red-legged frog (*Rana aurora draytonii*), and the locally rare species (not federally listed) southwestern pond turtle (*Clemmys marmorata pallida*) and foothill yellow-legged frog (*Rana boylii*). None of these three species have been recorded in the project study area, and they are unlikely to occur in the study area because of a lack of suitable habitat .

Birds

Seventeen species of birds were observed during surveys of the study area conducted between June and September 1993 by Service biologists. Five of these species were associated with the lagoon and beach, and 12 were associated with the riparian vegetation. In contrast, 108 bird species were identified in the whole Mission Creek drainage area in a 1986 survey (US Fish and Wildlife Service 1986). In this 1986 survey, 23 species were associated with the lagoon and beach area, and 35 were associated with the Lower Mission Creek area.

For the study area, several conditions may explain the difference in bird diversity observed in the two surveys, 1993 versus 1986. The seasons in which the surveys were conducted would affect the bird species observed. Because the recent survey was done in the summer, mostly residents and not migratory birds were sampled, whereas the 1986 survey encompassed several seasons and recorded a higher diversity of species. However, those migratory birds observed in the 1986 survey still would still be expected to utilize Lower Mission Creek. The lower diversity of birds occurring in the study area represents the higher level of habitat disturbance in the study area and the greater habitat heterogeneity in the upper drainage area.

No sensitive bird species were observed in the 1993 survey in the study area. In the 1986 survey, brown pelicans (*Pelecanus occidentalis*), a federally endangered species, were observed roosting in the mouth of Mission Creek near the lagoon estuary. Historic colonies of the federally threatened western snowy plover (*Charadrius alexandrinus nivosus*) and the federally endangered California least tern (*Sterna albifrons browni*) occurred until the 1930s at the mouth of Mission Creek. Human recreation activities on the beach now exclude nesting activities for these species; however, wintering and migrant populations of both species still utilize the area (Lehman 1994).

Mammals

In the entire Mission Creek drainage, 37 mammal species have been recorded (US Fish and Wildlife Service 1986). Of these species, only the more human associated and disturbance tolerant species are expected to occur in the study area. The sighting of deer tracks in 1985 near the De la Vina

Street bridge indicates that Lower Mission Creek may be utilized at least occasionally by large mammals (US Fish and Wildlife Service 1986). No rare mammals have been recorded for the Mission Creek drainage, and none are expected to occur in the study area.

Insects

The mouth of the Mission Creek drainage is the only segment of the study area that has potential habitat for rare insect species. Habitat for the tiger beetle (*Cicindela hirticollis gravida*) occurs in clean, dry, light colored sands in the upper zone of a beach adjacent to non-brackish waters. Habitat for larval forms of the wandering skipper (*Panoquinna errans*) occurs with salt grass (*Distichlis spicata*) vegetation, a common native plant present around the estuary. Skippers are insects in the order Lepidoptera, also including butterflies and moths. The disturbance from ongoing beach recreation and nearby urban development reduces the likelihood of either insect species remaining in the study area; however, no insect surveys have been conducted for the area.

Fishes

Mission Creek drainage is expected to support freshwater fish and invertebrate populations necessary as fish food resources. Cooper and Hempill (1984) conducted a survey of freshwater aquatic invertebrates and fish at several sites in the mid and upper reaches of the Mission Creek drainage. Aquatic benthic insects were the major type of invertebrates observed in this survey, and some variation in diversity was found over seasons and over location. The only fish observed were rainbow trout (*Oncorhynchus mykiss*) on Rattlesnake Creek between Los Canoas bridge and the debris dam upstream. No rare or sensitive fish or invertebrate species were found in the survey by Cooper and Hempill. Mosquito fish (*Gambusia affinis*) are stocked in Santa Barbara streams for mosquito control and have been observed in the study area near Canon Perdido Street (US Fish and Wildlife Service 1986).

The intertidal estuary at the mouth of the creek is expected to support a variety of saltwater tolerant aquatic animals. A 1985 fish survey conducted in the estuary (US Fish and Wildlife Service 1986) found arrow goby (*Clevelandia ios*) and top smelt (*Atherinops affinis*) between State Street and the ocean, and Pacific staghorn sculpin (*Leptocuttus arinatus*), top smelt, longjaw mudsucker (*Gillichthys mirabilis*), threespine stickleback (*Gastaerosteus aculeatus*), and two unidentified gobies between State Street and Mason Street. In addition to these estuarine and freshwater fish species, grunion (*Leuresthes tenuis*) are known to spawn on the beaches of Santa Barbara. Grunion spawning occurs between February and September.

Tidewater Goby

Ambrose et al. (1994) observed the federally endangered tidewater goby (*Eucyclogobius newberryi*) during a survey of the estuary in autumn 1993. Tidewater gobies previously were unreported for the Mission Creek estuary.

Tidewater goby habitat is the upper estuary, usually centered on the interface between freshwater and

saltwater. Tidewater gobies often can migrate upstream approximately one-half mile into freshwater, and migrate downstream into saltwater up to salinity of about 28 parts per thousand (ppt). However, the species typically occurs in salinities of less than 12 ppt (Swift et al. 1989).

Tidewater gobies are bottom dwellers and typically occur at depths of less than three feet. In streams they inhabit low-velocity habitats out of the main current (Moyle 1976). During winters when heavy precipitation occurs, much of a population may be lost due to the strong outflowing current. During this time, backwater habitat may be an important refugium for some of the population. A closed lagoon mouth during the summer months provides stable low salinity and low flow habitat conditions for the species. These optimal conditions from late spring to early autumn are needed for recovery of tidewater goby populations decimated by high winter flows (Jerry Smith, Biology Department, San Jose State University, personal communication 1995).

Tidewater gobies may spawn at any time of the year (Goldberg 1977), but spawning is usually heaviest from spring to mid summer. Tidewater goby reproduction takes place in water temperatures between 15 to 20 degrees Centigrade (60 to 65 degrees Fahrenheit), and at salinities of 0 to 25 parts per thousand (Swift et al. 1989; Swenson 1993a, 1993b 1994). Typically, winter rains and cold weather interrupt spawning, but in some drought years reproduction may occur all year. Males begin digging breeding burrows in relatively unconsolidated, clean, coarse sand (averaging 0.5 millimeters in diameter) in April or May after lagoons close to the ocean (Swift et al. 1989, Swenson 1994). Swenson (1994) has shown that tidewater gobies also prefer this substrate in the laboratory.

Water temperatures in lagoons closed to the ocean seldom exceed a range of 10 to 25 degrees Centigrade (50 to 77 degrees Fahrenheit), and usually fall somewhere within this temperature range. South of Point Conception, winter ocean temperatures are typically 9 to 11 degrees Centigrade (48 to 52 degrees Fahrenheit), but late summer ocean temperatures reach 19 to 21 degrees Centigrade (68 to 72 degrees Fahrenheit). Thus, in southern California, lagoons are usually warmer than the ocean in winter and cooler than the ocean in summer (Swift et al. 1989).

Steelhead Trout

Historically, steelhead trout (anadromous populations of *Oncorhynchus mykiss*, the same species as rainbow trout) have occurred in Mission Creek; however, the most recent observation was in 1950 (US Fish and Wildlife Service 1986). Trout surveys conducted along Mission Creek from May 26, 1995, to June 6, 1995, resulted in only freshwater rainbow trout being observed (US Army Corps of Engineers 1995). Currently, National Marine Fisheries Service is considering listing of steelhead trout as a federally endangered species under the Endangered Species Act, with final listing status anticipated by August 1997.

Coastal trout have two distinct life history strategies. Resident, nonmigratory trout only occur in freshwater habitats, but anadromous steelhead trout grow and mature in the ocean and return to freshwater to spawn. Historically, steelhead in Mission Creek migrated upstream and spawned during the winter in Rattlesnake Creek and Upper Mission Creek. Recently, severe impediments to fish migration have been constructed, including the CalTRANS channel and debris basins, both as

described in the Reconnaissance Flood Control Study.

Steelhead trout have well developed homing abilities and often spawn in the same stream in which they were reared as juveniles. Upstream migration usually takes place between January and March. Young steelhead emerge from the gravels between March and May and live in freshwater for one to four years before downstream migration to the ocean from February to May. Steelhead requirements for passage include a dissolved oxygen content of 6.5 to 7.0 milligrams per liter, a water depth of greater than 0.6 feet, and a water velocity of less than 2.4 feet per second (Entrix 1994).

ENDANGERED SPECIES

Table 1 provides a list of federally endangered or threatened species that may occur in the study area. Of these species only tidewater goby and brown pelican actually have been observed in the study area. The additional species listed in Table 1 are those species that have been observed in the vicinity of the Mission Creek drainage.

If a federally listed species may be affected by the proposed project, the Corps should consult with the Service pursuant to Section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended). Informal consultation or conferences may be conducted to exchange information and to resolve conflicts with respect to listed species prior to a written request for formal Section 7 consultation. A federal agency is required to confer with the Service on any action that is likely to jeopardize the continued existence of any species proposed for Federal listing. Conferences are intended to identify and resolve potential conflicts between an action and a listed species at an early point in the planning process.

ALTERNATIVES ANALYSIS

The analysis below addresses each of the various alternatives outlined in the Reconnaissance Flood Control Study prepared by the Corps (Corps of Engineers 1995). Recommendations from the Service and issues to consider are included in the discussion under each alternative, but most of the recommendations or issues can apply to several different alternatives.

Conveyance Improvement Alternatives

3210 cfs Alternative

The Reconnaissance Flood Control Study indicates that this alternative may not achieve adequate flood control. The oxbow low flow channel could provide some opportunity for riparian restoration and possibly some riparian habitat enhancement along the reconstructed channel. However, habitat in the oxbow would be somewhat isolated from the remainder of the creek corridor and also could be a maintenance problem. An isolated, vegetated oxbow habitat also may attract human occupants.

The Reconnaissance Flood Control Study does not provide adequate information regarding any

modifications to tidewater goby habitat under the 3210 cfs alternative, except a general conclusion that the lagoon likely would be breached during larger storm events. However, under the 3210 cfs alternative with the current narrow stream channel, protected refugia for gobies would be much more limited during high flow conditions than under the 5800 cfs alternative with its potentially wider stream channel.

5800 cfs Alternative

The Reconnaissance Flood Control Study indicates that this alternative would achieve improved flood control measures, and could provide for greater riparian habitat enhancement opportunities if the stream channel (bottom and top inverts) were wider and the overall shallower streambanks were established with riparian vegetation (also discussed under the environmental restoration alternatives).

In addition to temporary habitat modification during construction, under this alternative the increased flows at the mouth of Mission Creek during larger storm events probably would result in adverse habitat modifications for the tidewater goby, mostly by breaching the lagoon at possibly an accelerated frequency. The lagoon probably would be breached under both the 3210 and 5800 cfs alternatives. However, during the Section 7 consultation process, any adverse effects to tidewater goby habitat should be balanced against any multispecies gain in riparian habitat value and protected refugia afforded to gobies by a wider stream corridor established with native plant communities.

Diversion Alternative

The diversion alternative includes the 3210 cfs alternative and adds approximately 2000 cfs of flood control capacity by construction of a separate artificial channel along Bath Street. The Reconnaissance Flood Control Study does not appear to be clear on how the diversion structure would perform if its outfall structure were located below mean high tide elevation and a large storm event were to occur coincidental with a high tide. In addition, the preliminary NED analysis (page 53 in the Reconnaissance Flood Control Study) indicates that the diversion alternative yields a similar benefit-to-cost ratio, but does not include net benefits gained by environmental restoration activities associated under the conveyance improvement alternatives.

Environmental Restoration Alternatives

The Service interprets the environmental restoration alternatives to involve three principal elements: (1) modification of the Mission Creek estuary by breaching the lagoon (dredging the sand bar) or installing pipes to the ocean to improve water quality conditions; (2) establishing riparian vegetation comprised of native woody plants along the streambanks; and (3) installing structures or otherwise modifying the creek channel to facilitate passage of anadromous fish, namely steelhead trout. Any or all of these three elements could be incorporated into a flood control project. The discussion below addresses each of these three elements.

Estuary Modification

Specific modification of the lagoon or estuary as a result of project construction is not clearly defined in the description of project alternatives, but modifications of the lagoon should be analyzed to address any adverse effects to tidewater goby habitat. Expected post-project water quality conditions in the lagoon first need to be defined and described in order to provide opportunities to minimize adverse impacts to the tidewater goby as well as to understand potential for habitat enhancement for this species.

However, the need to modify the estuary or lagoon does not appear to be part of the basic project purpose for flood control, especially if a lagoon breach were to occur from late spring to early autumn as a means to reduce algal blooms or to accomplish other indirect purposes. Concerns about stagnant water in the lagoon might be resolved by flushing the lagoon with a portable, temporary pump and hose system that pumps water from the ocean into the lagoon, much like how water enters the lagoon during a high tide.

In general, the Service strongly discourages breaching of a lagoon with tidewater goby present outside of the winter rainy season. Furthermore, if the sand bar below the lagoon were dredged, sand may not replenish naturally because littoral drift that transports sand from upcoast likely is blocked by the harbor, further diminishing tidewater goby habitat if a lagoon did not re-establish. As indicated above under the description of existing biological resources, tidewater goby habitat can benefit from a closed lagoon system in the summer.

Also as noted above under the description of biological resources in the study area, tidewater goby is reported to tolerate a fluctuating range of water quality conditions throughout its geographic distribution. Therefore, to maintain habitat for this species at Lower Mission Creek, any flood control project constructed should maintain the range of water quality, water flows, and other habitat conditions present at the site.

During the summer, when flow in the creek is minimal or absent, limited dewatering for streambank stabilization and construction upstream of the estuary likely would not affect goby habitat. In general, equipment operation in the streambed should be limited to a period from mid summer to mid autumn, when the channel is driest and potential disturbances to aquatic life and nesting birds would be minimized. As plans are developed in more detail, the Service should be consulted to recommend a protocol of best management practices be developed for equipment operation and placement of temporary erosion control measures in the stream channel. Any short-term adverse impacts should be weighed against the long-term environmental gains.

Riparian Vegetation Establishment

The most significant environmental restoration opportunity with the highest potential to increase habitat value undoubtedly lies in establishing a corridor of native (mostly woody) plants amidst the stabilized streambank. Such a continuous riparian corridor would improve habitat conditions for migratory birds, and also would serve as a naturalized landscape link between the ocean and the

upper watershed. A comprehensively planned urban stream corridor also would improve visual quality or æsthetic value along the creek, mainly by hampering streambank erosion and eliminating the mishmash of structures now installed at individual properties.

Of course, the shallower a streambank slope, the more area is available for riparian vegetation. Even for a 1:1 or 2:1 slope subject to periodic flows (consistent with the conveyance improvement alternatives) bioengineering techniques are available that can integrate vegetation and durable hardscape structures. Such methods for Lower Mission Creek might include a type of stacked and terraced gabion modified with isolated, open areas containing soil for plant establishment.

One advantage of having open areas of isolated soil and vegetation is that they would discourage colonization by giant reed grass, *Arundo donax*, one of the worst pest plants in coastal riparian habitats, including Lower Mission Creek. Like bamboo, *Arundo* spreads vegetatively by rhizomes (underground stems) instead of by seed dispersal. Existing native trees and special-interest exotic trees could be preserved and accommodated with special treatments using a modified bioengineering approach on a 1:1 or 2:1 slope. Some native plants, including trees and shrubs, would be lost by the work, but the spread of exotic pest plants would be reduced substantially.

Various bioengineering approaches are possible to apply in the study area, but a detailed site analysis and prescription of specific methods is beyond the scope of this Planning Aid Letter. However, complete specifications, including species selection and installation methods, could be provided in any future Coordination Act Report.

Anadromous Fish Passage

If determined to be a project goal, passage for steelhead trout should be considered in stream channel design and associated establishment of riparian vegetation. For example, to maintain the coolest water conditions, channel features designed for fish passage should be placed on the side of the stream channel with minimal sun exposure and shallowest sun angle, usually the southernmost side of the channel. Riparian vegetation also should be located to maximize shading over the water, usually on the southernmost side of the channel. Additional discussion on the practicability of installing aids to fish passage is offered under the Fish Habitat section below.

DATA GAPS AND STUDIES NEEDED

Although some design features are recommended above under the discussion of various project alternatives, additional data are needed for the Service to analyze each project alternative completely in order to prepare a formal biological opinion. The Service recognizes that the level of detail in the Reconnaissance Flood Control Study is only the beginning of a more refined analysis as part of the planning process, as may occur through further study in the form of a General Reevaluation Report.

Fish Habitat

Enhancement or restoration of fish habitat for either steelhead trout or tidewater goby will require

specific design features to be incorporated into any project alternative that ultimately is constructed. For steelhead trout, the most important design feature would address fish passage in the stream channel, as discussed above. Design features to enhance fish passage include wing walls, artificial pools, riffles, shaded streambanks, and other features that are outlined well with locations described in the technical appendices of the Reconnaissance Flood Control Study. The historic preservation status of the mission-era dam on Upper Mission Creek may preclude installation of fish ladders or similar structures at that portion of the creek, thereby cutting off a portion of the watershed for steelhead access.

Although fish passage features can be installed throughout much or all of Mission Creek, the Service at this time strongly advises the Corps to consider carefully the practicability of maintaining anadromous fish passages through the onslaught of urban stresses in Mission Creek. The Service recommends that the Corps investigate how the funding and authorizations to restore anadromous fish habitat in Lower Mission Creek also could apply to other waterways in the region. Restoration of steelhead trout habitat undoubtedly could be accomplished much more efficiently elsewhere on the south coast of Santa Barbara County or on Santa Ynez River, Santa Clara River, or Ventura River. Clearly, where to restore steelhead trout habitat most effectively and efficiently is an evolving issue of concern to environmental activist groups and the resource agencies. The Service certainly will advise the Corps as policies and plans are developed.

For tidewater goby, the most important design feature to be incorporated into any project alternative would address water quality conditions (salinity, temperature, etc.) in the lagoon or estuary at the mouth of Mission Creek. Before proceeding with more detailed planning for a flood control project, current habitat conditions for tidewater goby should be assessed and presence of the species should be surveyed at Lower Mission Creek to address the potential extent and magnitude of any disturbances during project construction. Such a study also will help to determine if suitable goby habitat occurs above the six-inch drop in channel elevation that now functions as a barrier to goby migration upstream. Such a study also will enable the Service to prepare a more informed and conclusive biological opinion should one be necessary later in the planning process for Lower Mission Creek.

Riparian Vegetation

The vegetation establishment methods and bioengineering methods described above are well known and are successful in a wide range of applications. In addition, most of the pertinent information about species selection or planting methods already is known or readily would be available with one or two days of research. However, any data gaps present or studies needed concern whether the streambanks consisting largely of terraced gabions, or equivalent hardscape structures with open spaces for planting, would be sufficiently durable for erosion control and would remain intact during high flows in the channel.

Real Estate Requirements

The actual property or right-of-way available under a channel improvement easement would need

to be known before a vegetated hardscape or bioengineering system could be designed in detail. The Reconnaissance Flood Control Study includes a limited discussion of real estate requirements. However, much of the scattered assortment of erosion control structures currently installed in or near the channel seems to be constructed at the edge of private properties or within the public right-of-way. Acquisition of any additional narrow right-of-way may be feasible and highly appropriate to enable construction of a uniformly vegetated, æsthetically enhanced project that meets community preferences and accommodates flood control needs in Lower Mission Creek.

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TABLE 1

Federally Endangered or Threatened Species that May Occur in the Study Area

Lower Mission Creek Flood Control Study
Santa Barbara County, California

Species	*Federal Listing Status*
FISHES	
Tidewater goby (*Eucyclogobius newberryi*)	FE
Steelhead trout (*Oncorhynchus mykiss*)	PFE
AMPHIBIANS	
California red-legged frog (*Rana aurora draytonii*)	FT
BIRDS	
Brown pelican (*Pelicanus occidentalis*)	FE
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT
California least tern (*Sterna antillarum browni*)	FE

FE Federally endangered
FE Federally threatened
FE Proposed federally endangered

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APPENDIX - B

FINAL COORDINATION ACT REPORT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY
U.S. FISH AND WILDLIFE SERVICE
VENTURA FISH AND WILDLIFE OFFICE
VENTURA, CALIFORNIA
MAY 2000

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

May 3, 2000

U.S. Army Corps of Engineers
Los Angeles District
CESPL-PD-RQ (R. Farve)
P.O. Box 532711
Los Angeles, California 90053-2325
(Attn: Rey Farve)

Subject: Final Coordination Act Report for the Lower Mission Creek Flood Control Feasibility Study

Dear Mr. Farve:

Enclosed is the final Coordination Act Report by U.S. Fish and Wildlife Service for the Lower Mission Creek Flood Control Feasibility Study conducted by the U.S. Army Corps of Engineers. This work product is provided under Military Interdepartmental Purchase Request (MIPR) number W81EYN91444787 and Scope of Work dated June 4, 1999.

Under the authority of the Fish and Wildlife Coordination Act, the final Coordination Act Report provides comments on the preferred flood control alternative for Lower Mission Creek identified by the Corps.

If you have any questions regarding this project please call Diane Pratt of my staff at (805) 644-1766.

Sincerely,

Diane K. Noda

Diane K. Noda
Field Supervisor

Enclosure

FISH AND WILDLIFE COORDINATION ACT REPORT

Lower Mission Creek Flood Control Feasibility Study
Santa Barbara County, California

Prepared for the

U.S. Army Corps of Engineers
Los Angeles District
Los Angeles, California

by the

U.S. Fish and Wildlife Service
Ventura Fish and Wildlife Office
Ventura, California

Diane Noda, Field Supervisor
Gregory S. Sanders, Division Chief, Division of Habitat Conservation
S. Diane Pratt, Author and Project Biologist
Glenn M. Greenwald, Project Biologist

March 2000

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SUMMARY OF FINDINGS

This document constitutes the report of the U.S. Fish and Wildlife Service (Service) regarding the U.S. Army Corps of Engineers' (Corps) proposed Lower Mission Creek Flood Control Feasibility Study in Santa Barbara County, California. It has been prepared under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (16 U.S.C 661-667e, 48 Stat. 401), as amended, and with the spirit and intent of the National Environmental Policy Act (42 U.S.C. 4321-4347, 83 Stat. 852), as amended.

The Lower Mission Creek Feasibility Study and Preliminary Environmental Impact Statement/ Environmental Impact Report (EIS/EIR) (U.S. Army Corps of Engineers 1999) evaluates eleven alternatives (ten structural alternatives and the No Action alternative) for flood control. Each structural alternative for flood control is distinguished by having a conveyance capacity either of 2500 or 3400 ft3/sec (cfs) and involving vertical walls throughout the length, or mostly stepped walls with vertical walls where necessary. The Corps subsequently revised the Lower Mission Creek Feasibility Study to include an additional flood control alternative, Alternative 12, in the Lower Mission Creek Feasibility Study and Draft EIS/ EIR (U.S. Army Corps of Engineers 1999b). In addition to providing flood control sufficient to accommodate 3400 cfs (20-year flood events), Alternative 12 would provide for beneficial habitat enhancement actions, including the creation of Habitat Expansion Zones and revegetation of native riparian species along sloped banks stabilized by riprap. Alternative 12 is the locally preferred plan and is designated by the Corps as the National Economic Development plan and the Recommended Plan.

Based on the analysis in this report, we agree with the Corps that of the twelve alternatives currently proposed, Alternative 12 will allow the greatest benefit to habitat of Lower Mission Creek. This alternative would meet flood control needs and may result in the improvement of the biological resources in the project area. However, we recommend modifications to this alternative to reduce the impacts to the project area, further benefit biological resources within the project area, and to improve the likelihood of success of the proposed mitigation and habitat enhancement actions.

INTRODUCTION

This document constitutes the Fish and Wildlife Coordination Act Report (FWCA Report) of the U.S. Fish and Wildlife Service (Service) regarding the U.S. Army Corps of Engineers' (Corps) proposed Lower Mission Creek Flood Control Feasibility Study for the City of Santa Barbara in Santa Barbara County, California. It has been prepared under the authority of and in accordance with the provisions of the Fish and Wildlife Coordination Act (16 U.S.C. 661-667e, 48 Stat. 401), as amended, (FWCA) and with the spirit and intent of the National Environmental Policy Act (42 U.S.C. 4321-4347, 83 Stat. 852), as amended. Work performed in the preparation of this report is commensurate with the Scope of Work attached to the Military Interdepartmental Purchase Request (MIPR) #W81EYN91444787.

In 1986, the Corps recommended channelization of Lower Mission Creek in the Feasibility Study for the Santa Barbara County Streams Flood Control Project. The Service prepared a FWCA Report for the Feasibility Study and the accompanying Environmental Impact Statement (1986). Due to the lapse of time between the feasibility stage and the design stage, a supplemental Environmental Impact Statement was under formulation in 1992-93 to update sedimentation and other environmental issues associated with the project. After further analysis, the flood control alternative proposed in 1986 was determined to be infeasible due to sedimentation problems and was never implemented.

In 1993, the Mission Creek Consensus Group was created to work with the Corps and the Santa Barbara County Flood District in the identification of flood control alternatives which would be acceptable to the local community. We prepared a Draft FWCA (DFWCA) Report for the alternative solutions developed by the Corps (U.S. Fish and Wildlife Service 1994). The Lower Mission Creek Reconnaissance Flood Control Study prepared by the Corps focused on the feasibility of these and other recommended alternatives, including a semi-natural, soft-bottom channel design of particular interest to the City and local residents (U.S. Army Corps of Engineers 1995b). In 1997, we prepared a Planning Aid Letter for technical assistance in future planning (U.S. Fish and Wildlife Service 1997).

In March of 1999, the Corps prepared the Lower Mission Creek Feasibility Study and preliminary Environmental Impact Statement/ Environmental Impact Report (EIS/ EIR) for eleven flood control alternatives (U.S. Army Corps of Engineers 1999). In December of 1999, the Corps revised the study to include Alternative 12 in the Lower Mission Creek Feasibility Study and Draft EIS/ EIR (U.S. Army Corps of Engineers 1999b). The Lower Mission Creek Flood Control Feasibility Study and Draft EIS/ EIR (U.S. Army Corps of Engineers 1999b) were prepared by the Corps to evaluate eleven structural alternatives and a No Action alternative. Each structural alternative differs in conveyance capacity and the nature of bank and channel stabilization designs. This FWCA Report will evaluate Alternative 12, the Recommended Plan, based on the Lower Mission Creek Flood Control Feasibility Study and Draft EIS/ EIR (U.S. Army Corps of Engineers 1999b) and a revised project description for Alternative 12 received by the Service in March of 2000.

Our findings in this FWCA Report are based on the current project description provided by the Corps and on information obtained from previous reports, publications, and biological surveys of the study area. We coordinated with the California Department of Fish and Game and National Marine Fisheries Service for proposed flood control activities on Lower Mission Creek and their comments are incorporated throughout this report.

I. DESCRIPTION OF THE PROJECT AREA

The Lower Mission Creek Flood Control Feasibility Study evaluates flood control alternatives for an approximately 1.1 mile section of Mission Creek from the intersection of Canon Perdido and Castillo Streets to Cabrillo Boulevard, located in Santa Barbara County, California (Figure 1). This section of Mission Creek flows southeast through the City of Santa Barbara and eventually discharges into the harbor approximately 150 yards east of Stearn's Wharf.

The Mission Creek drainage, the largest of several coastal stream systems in the Santa Barbara region, originates from the Santa Ynez Mountains in the Los Padres National Forest, north of Santa Barbara. The drainage, including its tributaries, is approximately 11.5 square miles in size (U.S. Fish and Wildlife Service 1986). The headwaters of Mission Creek and its major tributary, Rattlesnake Creek, occur at 3,500 feet in the Santa Ynez Mountains. From here, these creeks flow south into the City of Santa Barbara and converge just south of the Santa Barbara Botanical Garden. Mission Creek then flows south and southwest until it reaches Highway 101, where it curves southeast and flows several more miles to the Pacific Ocean.

Annual precipitation in the Mission Creek watershed ranges from 18 inches near the coast to 28 inches at the origin (U.S. Army Corps of Engineers 1975). The rainy season is from December to March. The lower reaches of Mission Creek are typically dry from early summer to the beginning of the next wet season. During the rainy season, Mission Creek ranges from a comparatively small stream carrying an average maximum of 370 cubic feet per second (cfs) during non- flood years to a creek capable of destructive peak flows of 5120 cfs (observed on January 10, 1995) and 2412 cfs on average during prolonged, heavy winter rains (hydrology data from the U.S. Army Corps of Engineers 1995a). The incidental trickle moving down the channel after mid- summer appears to be primarily urban runoff which enters Mission Creek via storm drains along its course.

Mission Creek also periodically receives water from the Santa Barbara water tunnels at two locations. Water is released into Mission Creek about 5.2 miles (8.3 km) upstream from the upper limit of the project area and into a tributary of Mission Creek about 3.5 miles (5.7 km) upstream from the project area (just south of Foothill Road). In July of 1999, upon the request of California Department of Fish and Game (CDFG), the Santa Barbara City Water District began releasing water from these tunnels in order to sustain oversummering juvenile and adult southern steelhead populations in Mission Creek (Cardenas pers. comm. 1999).

The physical condition of the Mission Creek drainage changes considerably down its length. Although no major impoundments occur along Mission Creek, the Old Mission Dam is located above the Santa Barbara Botanical Garden. In addition, two small debris basins occur on the upper reaches of the creek system; a 15,900 cubic yard basin on Mission Creek approximately 7.2 km upstream from the project area (at an elevation of about 1150 feet), and a 8,300 cubic yard basin on Rattlesnake Creek approximately 4.7 miles (7.5 km) upstream from the project area (at an elevation of about 850 feet). The upper reaches of Mission Creek and Rattlesnake Creek are characterized by cobble- and boulder-lined channels with one to five foot deep pools separated by shallow riffles, small waterfalls, and chutes (U.S. Fish and Wildlife Service 1986).

In Lower Mission Creek, the natural channel bottom and banks are interrupted by three areas of concrete. Approximately 0.3 miles of a concrete trapezoidal channel occurs from Los Olivos Street to Mission Street. An approximately 0.8-mile concrete trapezoidal channel occurs from Valerio Street to Canon Perdido, the point where the project study area begins. Lastly, a 0.1-mile rectangular concrete-bottomed and stone-walled channel occur in the project study area from the Southern Pacific Railroad tracks to Chapala Street. In addition, the banks and stream bottom in the project area have been altered with grout stone, sacked concrete, pipe and wire revetment, gabions, bulkhead structures, and other stabilization structures to prevent bank erosion and flooding to adjacent development. Thus, the physical characteristics of the creek have been modified to some extent, especially along the lower portions.

Mission Creek flows south and southwest until it reaches Highway 101, where it curves southeast. The reach of Lower Mission Creek referred to as the "oxbow" is the length of the creek between Gutierrez Street Bridge and Chapala Street Bridge. Here the creek makes several sharp turns while crossing under Highway 101, Montecito Street Bridge, and the Union Pacific Railroad before continuing in a southeastern direction to the ocean (Figure 1).

Saline water from the ocean mixes with fresh water to create a narrow estuary extending from the berm to approximately Mason Street which exhibits seasonal variations in length. Estuarine properties become evident between Yanonali and Mason Streets in the late summer/ early fall. At the Yanonali Street Bridge, an approximately 1.5 feet high man-made sill spanning the entire channel usually blocks tidal influence farther upstream. During the rainy season (December to March), increased stream flow results in a decrease in or absence of salinity between Cabrillo Boulevard and Yanonali Street.

A recent study of Lower Mission Creek conducted by the City of Santa Barbara reveals a seasonal pattern in properties of salinity, turbidity, and water temperature in the estuarine portion of the creek (City of Santa Barbara 1995). Samples were taken weekly from two locations in the lower part of the estuary between Cabrillo Boulevard and Mason Street beginning in late November of 1994 and continuing through October, 1995. For reference, the open ocean has a salinity of approximately 35 parts per thousand (ppt). Salinity levels in the study area were measured at approximately 20-30 ppt in the summer months. Peak salinity levels of approximately 30 ppt occurred between late summer and late fall, when streamflow from the

Mission Creek watershed was minimal. During the winter months (January to April) salinity levels were less than 1 ppt. Measurements of total turbidity of the water column of Mission Creek from Cabrillo Boulevard to Mason Street revealed minimal sediment content throughout the year. Turbidity levels ranged from less than 1 nephelometric turbidity unit (NTU) to about 10 NTUs, with the exception of two sharp increases observed in mid-January and in mid-May of 1995. These peaks in turbidity coincide with the onset of winter rains which result in a rise in stream flow carrying sediments through the channel. Measurements of water temperature of Lower Mission Creek also revealed a seasonal pattern. Between mid- January and mid- May, water temperature varied between 15 and 20 degrees Celsius (C), and rose gradually to about 25 C by mid- August. Temperatures began to cool in the fall.

The condition of the natural resources varies along the length of the Mission Creek watershed. The creek flows through steep terrain and the vegetation of the drainage is relatively undisturbed in its upper reaches, north of the Santa Barbara Botanical Garden. On this portion of the drainage, riparian woodland vegetation occurs along Mission Creek and its tributaries, and the surrounding vegetation includes chaparral and coast live oak woodland (U.S. Fish and Wildlife Service 1986). South of the Botanical Garden, the terrain becomes flatter and the creek shows more signs of disturbance associated with the greater density of adjacent commercial and residential development. Within the project study area, between Canon Perdido Street and Cabrillo Boulevard, the natural habitat of the creek is highly modified. Only remnants of native vegetation remain in the creek and estuary, and the area adjacent to the creek consists of buildings, ornamental landscapes, parking lots, and roads. Natural habitat is significantly limited by urban development including periodic clearance of vegetation and accumulated sediments from the channel, the indiscriminate use of the channel as a dumping ground for refuse, intermittent and private hard siding of its channels, housing along both sides of the channel, bridges carrying roads over the channel, discharge of storm water lines into the channel (especially underneath bridges), and the concentration of business developments within or adjacent to residential neighborhoods.

Although the condition of portions of the Mission Creek watershed are not pristine, the drainage as a whole is an important riparian system for the area. Mission Creek and its main tributary, Rattlesnake Creek, are designated by Santa Barbara County as prime examples of freshwater streams in the County. This designation maintains that these creeks deserve special protection because the upper Mission Creek drainage supports extensive areas of quality riparian communities with high wildlife value.

Existing local projects at Lower Mission Creek

The Mission Creek watershed was studied as part of Project Clean Water (PCW), a coalition of government and private interest groups that have come together to investigate the contamination of local creeks within Santa Barbara County. Project Clean Water began in 1998, when the Santa Barbara County Board of Supervisors, the City Council of the City of Santa Barbara, and the City Council of the City of Carpinteria authorized participation in three coordinated water quality

projects and related cleanup efforts in south coast creeks. Water samples were taken four times a week for the period of October 22 through November 17, 1998 from Mission Creek and its tributaries and analyzed for bacterial content (total coliform, fecal coliform, and enterococcus) (Project Clean Water 1999b). Water samples taken within the proposed project area of Lower Mission Creek (Cabrillo Boulevard to Canon Perdido Street) yielded median total and fecal coliform content within the range of high to extremely high. Levels of enterococcus within the project area were moderate to extremely high. In April of 1999, PCW investigators reported to the Board of Supervisors that storm drains, creek encampments utilized by the homeless, and lagoon fauna such as birds are probable sources of high levels of bacteria in the lower watershed (Project Clean Water 1999a). The City and local groups have implemented creek cleanup efforts, and PCW recommended further creek and storm-drain cleanup to remove obvious sources of contamination (Project Clean Water 1999a).

The City of Santa Barbara's Community Development Department is currently working on the Creek Strategic Plan to restore the City's creeks to a natural appearance that would enhance the quality of life along the creeks. Included in the proposed work program is the identification of habitat enhancement opportunities along Lower Mission Creek concurrent with and in addition to the Lower Mission Creek Flood Control Project proposed by the Corps (City of Santa Barbara 1999). With local interest in the implementation of additional restoration actions along Lower Mission Creek, the final design of the flood control project may serve as an important basis on which to further enhance this urban creek.

In addition, the Wetlands and Riparian Restoration Working Group (RWG), established by Santa Barbara County (County) and the Cities of Santa Barbara and Carpinteria, advocates the development of wetland creation and enhancement and creek restoration programs as a long-term, cost effective way to reduce non-point source pollution and bacterial contamination of creeks and the ocean (Wetland and Riparian Restoration Working Group 1999). The RWG further recommends the use of creek and wetland restoration and construction of bio-filters as one solution to the County's current water quality problems. The RWG recognizes the riparian restoration opportunities within the watershed concurrent with the Lower Mission Creek Flood Control Project.

II. DESCRIPTION OF ALTERNATIVE PLANS

Eleven structural alternatives have been evaluated for increasing flood control protection and enhancing environmental resources along Lower Mission Creek. These alternatives and the No Action Alternative are described briefly below. The descriptions are based on information provided by the Corps (Lower Mission Creek Feasibility Study and Draft EIS/ EIR of December 1999 and additional information provided by the Corps as of March 2000 for the Lower Mission Creek Flood Control Feasibility Study). Each structural alternative for flood control is distinguished by having a conveyance capacity either of 2500 or 3400 ft^3/sec (cfs) and involving vertical walls throughout the length, mostly stepped walls (with vertical walls where necessary),

or a combination of a low vertical wall at the channel's edge with riprap-stabilized sloped banks. In all structural alternatives, natural stream bottom will be maintained and in some areas restored to natural, except for immediately underneath bridges and through the oxbow south of Highway 101.

Of the twelve proposed alternatives described below, the Corps decided to evaluate in detail four alternatives in the environmental analysis of the Draft EIS/ EIR for the Lower Mission Creek Flood Control Project (U.S. Army Corps of Engineers 1999b). The alternatives under further evaluation are the No Action Alternative (Alternative 1), Alternative 6, Alternative 8, and Alternative 12, which was designated as the Recommended Plan. The Corps has requested that the Service write the current Coordination Act Report to address the single preferred alternative, Alternative 12.

A description of the Recommended Plan (Alternative 12) was included in Section 3.5.2 of the Draft EIS/ EIR for the Lower Mission Creek Flood Control Project (U.S. Army Corps of Engineers 1999b). A revised project description for Alternative 12 was provided to the Service in March of 2000. The Recommended Plan is also the locally preferred plan and the National Economic Development (NED) plan.

Alternative 1

Under Alternative 1, the No Action Alternative, Lower Mission Creek would remain unaltered for flood control. The residents and business owners in the Lower Mission Creek flood plain will continue to experience flood damage every few years.

Alternative 2

This alternative will increase the channel capacity to 2500 cfs and would provide approximately a 15- year level of protection. Bank treatment upstream of Highway 101 will consist of stabilized banks at 2:1 (V:H) slope using stepped walls. Construction of stepped walls would allow planting of shrubby native species in a 5 feet wide space. Below Highway 101, concrete vertical walls will be the dominant bank treatment with sloped bank treatment applied wherever practical. Six bridges along the study reach would be replaced including Ortega Street, Cota Street, Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative 3

This alternative is similar to Alternative 2 in conveyance capacity (2500 cfs) and bridge replacement. Bank treatment will consist of concrete vertical walls throughout the length of the project.

Alternative 4

This alternative will increase the channel capacity to 3400 cfs and would thereby provide approximately a 20- year level of protection. Bank treatment will consist of concrete vertical walls throughout the length of the project. Nine bridges along the study reach will be replaced including De la Guerra Street, Ortega Street, Cota Street, De la Vina Street, Gutierrez Street,

Montecito Street, Union Pacific Railroad, Chapala Street, and Mason Street Bridges.

Alternative 5

This alternative is similar to Alternative 4 in conveyance capacity (3400 cfs) and bridge replacement. Bank treatment will consist of vegetated stepped bank at a 2:1 (V:H) slope throughout the study reach, except at the south end of the oxbow along the railroad tracks.

Alternative 6

This alternative is similar to Alternatives 4 and 5 in conveyance capacity (3400 cfs) and bridge replacement. Bank treatment upstream of Highway 101 will consist of vegetated stepped bank at a 2:1 (V:H) slope. Below Highway 101, vegetated stepped walls will be applied along the southeast bank, starting from midway between Chapala Bridge and Mason Bridge and extending down to State Street Bridge. Vegetated stepped walls will also be applied along the middle third of the southwest bank between Mason Street and State Street. Vertical walls will be maintained for the remainder of this reach.

Alternative 7

This alternative is similar to Alternatives 4 - 6 in conveyance capacity (3400 cfs) and bridge replacement. Bank treatment upstream of Highway 101 will consist of vegetated stepped bank at a 2:1 (V:H) slope. Below Highway 101, vertical walls will be the dominant bank treatment.

Alternative 8

This alternative is similar to Alternatives 4 - 7 in conveyance capacity (3400 cfs). Bank treatment will consist of vertical walls throughout the length of the project. This alternative will incorporate a new culvert by-passing the oxbow ("oxbow bypass"). The culvert will begin upstream of Highway 101, cross the highway, Montecito Street, and the railroad tracks before rejoining the creek just upstream of the Chapala Street Bridge. The oxbow will be left in place as a low flow channel. Seven bridges along the study reach will be replaced including De la Guerra Street, Ortega Street, Cota Street, De la Vina Street, Gutierrez Street, Chapala Street, and Mason Street Bridges.

Alternative 9

This alternative is similar to Alternative 8 in conveyance capacity (3400 cfs) and bridge replacement and will incorporate the oxbow bypass described above (Alternative 8). Bank treatment will consist of vegetated stepped bank at a 2:1 (V:H) slope throughout the study reach, except through the oxbow and the oxbow bypass.

Alternative 10

This alternative is similar to Alternatives 8 and 9 in conveyance capacity (3400 cfs) and bridge replacement and will incorporate the oxbow bypass described above (Alternative 8).
Bank treatment upstream of Highway 101 will consist of vegetated stepped bank at a 2:1 (V:H) slope. Below Highway 101, vegetated stepped walls will be applied along the southeast bank, starting from midway between Chapala Bridge and Mason Bridge and extending down to State

Street Bridge. Vertical walls will be maintained for the remainder of this reach.

Alternative 11

This alternative is similar to Alternatives 8 - 10 in conveyance capacity (3400 cfs) and bridge replacement and will incorporate the oxbow bypass described above (Alternative 8). Bank treatment upstream of Highway 101 will consist of vegetated stepped bank at a 2:1 (V:H) slope. Below Highway 101, concrete vertical walls will be the dominant bank treatment with sloped bank treatment applied wherever practicable.

Recommended Plan: Alternative 12

This alternative is similar to Alternatives 8 - 11 in conveyance capacity (3400 cfs). Four bridges along the study reach will be replaced including Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges. This alternative will incorporate a new culvert by-passing the oxbow ("oxbow bypass"). The culvert will begin upstream of Highway 101, cross the highway, Montecito Street, and the railroad tracks before rejoining the creek just downstream of the Chapala Street Bridge. The culvert will consist of two concrete boxes (15 foot wide by 6 feet high). The open portion of the channel beginning just upstream of Highway 101 will be approximately 200 feet in length. The culvert will be covered just before it crosses Montecito Street down to its confluence along the downstream end of the Chapala Street Bridge; this portion will be approximately 640 linear feet. The oxbow will be left in place as a low flow channel. A weir structure would be built at the inlet of the culvert. The crest of the weir would be slightly higher than the invert of the creek in order to direct lower flows through the oxbow. The invert of the downstream end of the culvert would be approximately 12 inches higher than the natural bottom.

Land acquisitions may provide for the widening of the creek and creation of habitat expansion zones at several locations along Lower Mission Creek. The habitat expansion zones would be planted with trees native to coastal California. Species planted may include western sycamore (*Platanus racemosa*), cottonwood (*Populus fremontii*), coast live oak (*Quercus agrifolia*), California laurel (*Umbellularia californica*), wax myrtle (*Myrica california*), hollyleaf cherry (*Prunus ilicifolia*), and white alder (*Alnus rhombifolia*).

Alternative 12 includes additional project design features, which are described in more detail in Section VIII of this Report. The environmental design provides for planting of native riparian species along sloped banks stabilized by riprap and enlargement of sloped planting areas.

The creek banks will consist of either a vertical wall or a combination vertical wall and riprap sideslope. The combination vertical wall and riprap sideslope will consist of vertical wall for the bottom half, while ungrouted riprap (15 inches thick) at a 1.5:1 (V:H) slope will form the upper half. The height of the vertical wall in this combination design will vary along the entire length of the project area . Riprap will be overlain on a layer of native rock and soil, with topsoil distributed through the interstices of the riprap, and covered with 9 inches of prepared topsoil. Concrete pipes in varying sizes (up to a maximum three feet in diameter) will be placed in

between the riprap to allow planting of native trees and vegetation. Species of riparian trees, including western sycamore, cottonwood, and coast live oak will be planted from 1 gallon nursery stock into cylindrical planters embedded within the riprap and spaced 40 feet apart.

Willow branches will be placed into prepared soil below the riprap in dense rows with the expectation that approximately 20% will sprout vegetatively and find their way through gaps in the riprap. Other native understory species, including arroyo willow (*Salix lasiolepis*), Mexican elderberry (*Sambucus mexicana*), and coyote brush (*Baccharis pilularis*), will be seeded into the top soil, or set out from liner stock.

Combination riprap and vertical wall will be the dominant bank treatment upstream of Highway 101, except in short reaches just upstream of Haley-De la Vina Bridge, between Cota and Bath Street Bridges, and just upstream of De la Guerra Bridge. Below Highway 101, the combination riprap and vertical wall will be applied along the southeast bank, starting from midpoint between Chapala Bridge and Mason Bridge down to midpoint between Mason Bridge and State Bridge (Figure 1). The remaining length of the project reach will consist of concrete vertical walls.

Existing natural stream bottom will be maintained and stream bottom that is now concrete lined will be restored to natural conditions, except for immediately underneath bridges and through the oxbow. Restoration to natural bottom will necessitate excavation and removal of one to four feet of streambed in the reach between De la Guerra Street bridge and Ortega Street Bridge, one to three feet of streambed between Ortega Street Bridge and Bath Street Bridge, two to three feet of streambed between Cota Street Bridge and Haley-De la Vina Bridge, and two to four feet of streambed between Haley-De la Vina Bridge and Gutierrez Street Bridge. In the reach between Chapala Street Bridge and State Street Bridge, there will be excavation and/or in fill of one foot of streambed. In the final reach of Lower Mission Creek from State Street Bridge to Cabrillo Boulevard Bridge, the streambed will be cleared of leftover footing from earlier structures.

III. EXISTING CONDITIONS

A. Stream Channel and associated resources

The Mission Creek drainage supports freshwater fish and invertebrate populations. The diversity of fish and aquatic invertebrates is expected to vary along the drainage due to the different types and conditions of habitats available. Cooper and Hempill (1984) conducted a survey of freshwater aquatic invertebrates and fish at several sites in the middle and upper reaches of the Mission Creek drainage. Aquatic benthic insects were the major type of invertebrate observed in this survey, and some variation in diversity was found over seasons and over location. The only fish observed were rainbow trout (*Oncorhynchus mykiss*) on Rattlesnake Creek between Los Canoas bridge and the debris basin. Mosquito fish (*Gambusia affinis*) are stocked in Santa Barbara streams for mosquito control and have been observed in the project study area near Canon Perdido Street (U.S. Fish and Wildlife Service 1986).

The intertidal estuary at the mouth of the creek within the project study area is expected to support a variety of saltwater tolerant aquatic animals. A fish survey conducted in the estuary in 1985 found arrow goby (*Clevelandia ios*) and topsmelt (*Atherinops affinis*) between State Street and the Pacific Ocean and found Pacific staghorn sculpin (*Leptocottus armatus*), topsmelt, longjaw mudsucker (*Gillichthys mirabilis*), threespine stickleback (*Gasterosteus aculeatus*), and two unidentified gobies between State and Mason Streets (U.S. Fish and Wildlife Service 1986). Ambrose et al. (1994) observed tidewater gobies (*Eucyclogobius newberryii*), a federally endangered species, during a survey of the estuary in the fall of 1993. Tidewater gobies were previously unreported for the Mission Creek estuary.

In 1994, Lafferty and Altstatt observed tidewater gobies above Cabrillo Boulevard, where estuarine conditions provide important food resources for the species (1995). Tidewater gobies are often found in waters of salinity levels around 10 ppt which are established in the uppermost brackish zone of lagoons formed at the mouths of coastal rivers and streams (Swift et al.1989). However, the tidewater goby can tolerate a wide range of salinities and can withstand short periods of fresh water (Swift et al.1989; Swensen 1995; Worcester 1992). According to a survey of water properties of Lower Mission Creek by the City of Santa Barbara, salinities within the range of 10 to 15 ppt were observed in the lower portion of the estuary (from Cabrillo Boulevard to Mason Street) during the spring (mid- April to end of May) (City of Santa Barbara 1995). As salinity levels within the lagoon and lower estuary increase from late spring through late summer/ early fall, tidewater gobies may be found up the channel as far as Yanonali Street. While reproduction of the tidewater goby occurs in breeding burrows created by males mostly on coarse sandy bottoms such as those found at the lagoon at the mouth of Mission Creek, gobies may also dig breeding burrows in mud (Swift et al. 1989; Swensen 1995).

During streambank and wading surveys conducted by the Corps, National Marine Fisheries Service (NMFS), and Service biologists during May and June of 1999, partially-armored three-spine stickleback (*Gasterosteus aculeatus microcephalus*) was the only fish species found between Yanonali Street and Canon Perdido Street. In this section of Lower Mission Creek, it was common to see several hundred of these stickleback, in the 15 - 60 mm size range, in a single pool. Below Yanonali Street, topsmelt, striped mullet (*Mugil cephalus*) and Pacific staghorn sculpin were commonly observed. A single prickly sculpin (*Cottus asper*) was found above the Mason Street bridge.

Historically, Mission Creek was one of a number of suitable streams located south of the Santa Ynez River that supported the passage of the anadromous steelhead trout, *Oncorhynchus mykiss*. The NMFS designated the population of steelhead resident in the coastal waters of Southern California an Evolutionarily Significant Unit (ESU) and listed the species as endangered (National Marine Fisheries Service 1997). Mission Creek is included among the coastal streams from the Santa Maria River south to Malibu Creek proposed by NMFS as critical habitat for the Southern California Coast ESU (National Marine Fisheries Service 1999).

Anadromous steelhead trout is distinguished definitively from freshwater rainbow trout upon genetic analysis. Identification of steelhead in the field is difficult and may be subjective. The NMFS considers trout found in any coastal stream with migratory access to the ocean as potential steelhead and considers any coastal stream which supports populations of trout as suitable habitat for steelhead (Johnson pers. comm. 1999). References to steelhead in the remainder of this report are based on these assumptions.

According to the California Department of Fish and Game (CDFG), Mission Creek is suitable in stream volume and stream flow to allow upstream passage of adult steelhead during the winter months (Cardenas pers. comm.1999). The natural bottom, which characterizes most of Lower Mission Creek, may allow adult steelhead to make a winter run to spawn in the upper reaches and smolts (young, outmigrating steelhead) to make their way downstream one or two seasons later. Despite physical impediments to steelhead passage upstream of the project area, CDFG regards Mission Creek to be among the better streams for anadromous trout south of Point Conception because it provides the structural requirements necessary for satisfactory navigation of the channel.

While systematic surveys of *Oncorhynchus mykiss* have not been conducted, there are accounts of steelhead in the Mission Creek watershed. Prior to 1984, steelhead were last observed in Mission Creek in 1950 (U.S. Fish and Wildlife Service 1986). Small trout feeding near the Museum of Natural History in early June of 1984 were identified as steelhead (Santa Barbara News-Press 1984). A 1995 study of salmonid fishes in Mission Creek examined eight trout, of which none had the phenotypic traits of migratory steelhead (U.S. Army Corps of Engineers 1995a).

Biologists have observed an increase in the numbers of steelhead in Southern California coastal streams since the El Nino season of 1997-98 (Cardenas, CDFG, pers. comm. 1999). During 1998 and 1999 at least 15 adult steelhead were observed by Service and CDFG biologists in Mission Creek upstream of the project area near Arrellaga Street and the Mission. In July of 1999, at least 15 adult and 10 to 100 juvenile steelhead were observed in pools in the upper Mission Creek watershed (Johnson, NMFS, pers. comm. 1999). At that time Mission Creek was beginning to dry, and within the next week the Santa Barbara City Water District, upon the request of CDFG, began releasing water from the Santa Barbara water tunnels in order to sustain the oversummering juvenile and adult southern steelhead populations (Cardenas pers. comm. 1999).

Aquatic invertebrates have not been examined systematically within the proposed project area of Lower Mission Creek. However, a recent survey for stream invertebrates, other aquatic species, and terrestrial species by University of California, Santa Barbara, graduate students at three sites along Mission Creek, approximately 1 mile to 4.4 miles (1.6 km to 7.1 km) upstream of the project area, indicate that there are more species and more absolute numbers of organisms present in the less channelized, more natural sections of Mission Creek (McGoogan and Bose 1999). The survey reports the presence of species of Diptera, Trichoptera (caddis fly larvae),

Coleoptera, Ephemeroptera (mayfly larvae), Mollusca, Zooplankton, worms, algae, spiders, and insects at the site consisting of natural stream bottom and riprap/concrete stabilized banks (approximately 40 meters south of the Pedregosa Street overpass).

Periodic mechanical scraping of the natural stream bottom at Lower Mission Creek for flood control purposes eradicates plant growth, fills any pools that would tend to form, and removes accumulated organic materials in the sediments. According to a survey of Lower Mission Creek by the Corps in September of 1997, recent channel maintenance had removed from the stream bottom and lower edges of the banks accumulated debris and substantial quantities of giant reed (*Arundo donax*) or *Arundo*, umbrella sedge (*Cyperus eragrostis*), castor bean (*Ricinus communis*), tree tobacco (*Nicotiana glauca*) and various other weedy species. During this survey it was noted that some vegetation had been left undisturbed from the recent channel maintenance; remaining patches of plants included yellow water evening primrose (*Ludwigia peploides*), cattails (*Typha* spp.), bulrushes (*Scirpus* spp.), and water smartweed (*Polygonum persicaria*).

A more recent creek survey in May of 1999 revealed many more established plant species including northern willowherb (*Epilobium adenocaulon*), water cress (*Rorippa nasturtium-aquaticum*), yellow sweet-clover (*Meliotus indicus*), black mustard (*Brassica nigra*), a coarse rye grass (*Lolium* sp.), rabbit's foot grass (*Polypogon monospeliensis*), sweet fennel (*Foeniculum vulgare*), smilo grass (*Piptatherum miliaceum*), and willow dock (*Rumex salicifolius*). In addition, blackberry (*Rubus ursinus*), white nightshade (*Solanum douglasii*), mulefat (*Baccharis salicifolia*), poison hemlock (*Conium maculatum*), sand-bar willow (*Salix exigua*), and salt cedar (*Tamarix* sp.) were observed.

Streambed and channel observations from the 1999 survey revealed a prevalence of rocky stretches and winding creek in some parts of the project area. Elsewhere, the stream bottom consisted primarily of very soft mud. Notable changes to the streambed attributable to stream flow over the two rainy seasons since the last channel maintenance were also observed. By May of 1999, Mission Creek had carried enough water to scour deep pools in its streambed. Deep pools had formed most commonly where currents had undercut the concrete sills that form the toe of private bank stabilization techniques, at bridge abutments, and in exposed rocky runs just above the freeway. These pools may constitute important refuges for aquatic organisms, especially if they prove to persist through the summer and fall.

B. Stream Bank and associated resources

Dense development and associated landscaping encroach into all edges of the creek within the project area. In addition, evidence of human alteration exists on the banks of Lower Mission Creek including some bank stabilization structures created by private landowners.

1. Vegetation

The banks of Lower Mission Creek sustain the rapid growth of opportunistic plants. Vegetation is dominated by invasive exotics, primarily *Arundo*, castor bean, and tree tobacco, with only

remnant pieces of native riparian and estuarine vegetation.

The invasion of weedy species has significantly degraded the native plant community structure. *Arundo* can be found growing in dense stands at the top of the banks in places along the channel where vertical walls exist, among other locations. Salt cedar is another highly invasive species which has established itself in the channel of Mission Creek. In addition, pampas grass (*Cortaderia jubata*) lines most of the existing bank between Mason and State Streets. Remnants of native willows [arroyo willow and black willow (*Salix lasiandra*)], which had survived recent channel maintenance, were observed at the foot of the bank. Red willow (*Salix laevigata*) and western sycamore seedlings have been noted at several locations along the creek.

The canopy of the project area is patchy in coverage and includes non-native species as well as large trees native to the coastal plain. Mature western sycamores grow at six locations along both sides of the channel. One coast live oak and one cottonwood also grow on the lower part of the banks. Additionally, six willows (*Salix* spp.) and four white alders are rooted on the upper bank above private revetments.

Twenty nine plant species were observed along the creek banks by Service biologists within the study area on September 20, 1993. Of these, 19 were non-native species (U.S. Fish and Wildlife Service 1994). No federally listed or otherwise rare plant species were observed, nor are expected to occur in the immediate vicinity of Lower Mission Creek.

In a vegetation survey of the whole drainage completed in 1986, 222 plant species were identified (U.S. Fish and Wildlife Service 1986). The difference in plant diversity between the whole drainage and the project study area can be attributed to the high level of disturbance found in the project study area relative to the whole drainage. The proximity of urban development and the human activities in and around the creek have altered the plant community significantly within the project area.

2. Amphibians and Reptiles

For the entire Mission Creek drainage, observations of 17 reptile species and nine amphibian species were recorded in 1986 (U.S. Fish and Wildlife Service 1986). Seven of these species are riparian dependent. The others can occur in uplands and in areas with less moisture. Only those that are most disturbance tolerant are expected to occur in the project study area.

During field reconnaissances of the Lower Mission Creek channel in September 1997, Pacific tree frogs (*Hyla regilla*) were seen or heard. Similarly, during daytime field surveys conducted in May and June of 1999 by Corps, Service, and NMFS staff, the only amphibian species observed along the project area was the Pacific tree frog. Tadpoles and adults of this species were commonly observed in pools, riffles, and runs from Canon Perdido to Highway 101. Adult Pacific tree frogs were commonly heard calling from the creek banks. No other amphibian species has been observed in the project area of Lower Mission Creek.

During the 1999 field surveys, the only reptile species observed was the western fence lizard (*Sceloperus occidentalis*). These lizards were commonly observed along the creek banks.

Sensitive amphibian and reptile species recorded for the Mission Creek drainage are the California red-legged frog (*Rana aurora draytonii*), a federally threatened species, and the southwestern pond turtle (*Clemmys marmorata pallida*), a California species of special concern. Neither of these species has been recorded or is expected to occur in the project study area of Lower Mission Creek.

3. Birds

In a 1986 survey of the entire Mission Creek drainage area, 108 bird species were identified over several seasons (U.S. Fish and Wildlife Service 1986). Twenty-three species were associated with the lagoon and beach area, and 35 were associated with the Lower Mission Creek riparian habitat.

During surveys of Lower Mission Creek conducted by Service biologists between June and September of 1993, seventeen species of birds were observed (U.S. Fish and Wildlife Service 1994). Five of these species were associated with the lagoon and beach, and 12 were associated with the riparian community. It is assumed that this more recent survey included mostly resident, nonmigratory birds, according to the season in which it was conducted. The lower diversity of birds occurring in the project area as compared to the whole drainage exemplifies the high level of disturbance to the project area and the greater habitat heterogeneity available in the upper portions of the drainage.

During field reconnaissances of the Lower Mission Creek channel in September 1997 and May 1999, several species of birds were observed, including Anna's hummingbird (*Calpte anna*), black pheobe (*Sayornis nigricans*), yellow warbler (*Dendroica petechia*), common yellowthroat (*Geothlypis trichas*), snowy egret (*Egretta thula*), green heron (*Butorides virescens*), red-shouldered hawk (*Buteo lineatus*), mallard (*Anas platyrhynchos*), and numerous shore birds on or around the lagoon on the south side of Cabrillo Boulevard.

In the 1986 survey of the entire Mission Creek drainage, brown pelicans (*Pelecanus occidentalis*), a federally endangered species, were observed roosting in the mouth of Mission Creek. California least terns (*Sternus antillarium browni*), federally listed as endangered, and western snowy plovers (*Charadrius alexandrinus nivosus*), a federally threatened species, may occasionally be seen along the shore in the vicinity of the lagoon on the south side of Cabrillo Boulevard. Although these sensitive bird species were observed during the 1986 survey, none were observed within the project area. No sensitive bird species were observed in the 1993, 1997, 1999 surveys.

4. Mammals

In the entire Mission Creek drainage, 37 mammal species have been recorded (U.S. Fish and

Wildlife Service 1986). Of these species only the more human associated and disturbance tolerant species would be expected to occur in the project area. The sighting of deer tracks in 1985 near the De la Vina Street bridge may be an indicator that lower Mission Creek is utilized at least occasionally by larger mammals (U.S. Fish and Wildlife Service 1986). During field reconnaissances of the entire Lower Mission Creek channel in September 1997 and May 1999, tracks of house cats and domestic dogs were seen regularly in mud along the creek. Tracks of racoons, opossums, and skunks were observed less frequently.

Townsend's big-eared bat (*Plecotus townsendii*) and pallid bat (*Antrozous pallidus*) have been recorded for Santa Barbara County and are listed by the state of California as species of special concern. Several other types of bats are more commonly observed in the Santa Barbara region. According to Paul Collins of the Santa Barbara Museum of Natural History, the big brown bat (*Eptesicus fuscus*) has been observed at the Foothill Road bridge of Mission Creek, approximately 3.5 miles (5.6 km) upstream of the project area (Collins pers. comm.1999). A systematic survey of bats has not been conducted within the project area of Lower Mission Creek.

Two species of migratory bats which roost in the bark of trees and have been observed in the Santa Barbara region are the red bat (*Lasiurus borealis*) and the hoary bat (*Lasiurus cinereus*). California myotis *(Myotis californicus*) is thought to be a resident of the area and has been observed roosting in crevices or hollows within trees or rotted out sections of trees as well as the larger hollows of man-made structures, such as bridges. Like the California myotis, Mexican free-tailed bats (*Tadarida brasiliensis*) and big brown bats roost in urbanized areas within the hollows of man-made structures and abandon their roost sites in the late fall, but it is questionable if they are migratory species (Collins pers. comm.1999).

No rare mammal species have been recorded for the Mission Creek drainage and none are expected to occur in the project area.

IV. ENDANGERED SPECIES

Table 1 is a list of all Federal and State special status species that may occur in the vicinity of the project. Of these species, Lower Mission Creek provides habitat for two federally endangered species: tidewater goby (*Eucyclogobius newberryi*) and southern California steelhead (*Oncorhynchus mykiss*).

Upon selection and final completion of the project design, the Corps should review the proposed action to determine whether that action may affect listed species pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (Act). Informal consultation may be used to exchange information and resolve conflicts with respect to listed species prior to a written request for formal consultation. The Corps should contact the Fish and Wildlife Service for consultations concerning the tidewater goby and the National Marine Fisheries Service for consultations concerning the southern California steelhead.

V. POTENTIAL IMPACTS RESULTING FROM ALTERNATIVE 12

Impacts from Alternative 12 were analyzed to the most detailed level possible given the project description provided by the Corps.

A. Stream Channel

1. Avoidance of impacts to sensitive aquatic species

During construction of Alternative 12, the aquatic habitat and associated species in the project area will be disturbed. However, the level of disturbance will be minimized due to the project design proposed by the Corps. Long-term impacts to the aquatic community will depend upon the ability of the aquatic system to recover from the initial disturbance and the level of maintenance for the channel (e.g. vegetation and sediment removal).

Avoidance of impacts to steelhead

According to NMFS, the proposed oxbow bypass may act as a barrier to migratory passage of steelhead through Lower Mission Creek (Johnson pers. comm. 1999). The Corps will need to design the culvert in such a way that NMFS agrees there will be no impediments to steelhead passage. Upon completion of project design and selection of an alternative, the Corps should review the proposed action to determine whether that action may affect southern California steelhead pursuant to Section 7 of the Act. At that time, NMFS may provide specific comments and recommendations on the impacts of the project on steelhead. Potential impacts to steelhead and avoidance measures currently proposed by the Corps are discussed below and in Section V.C. (Operation and Maintenance).

Operation of machinery in the channel at times when steelhead could be present constitute a potential impact. Direct contact with mechanized equipment operating in flowing water could result in injury or death to passing steelhead. For all construction activities which alter the banks or stream bottom, the Corps has proposed the exclusion of machinery from the channel and stream bottom any time significant flows pass down Mission Creek between mid-December and mid-May. Project construction would not occur within the flowing water between mid-December through March. Select locations upstream would be monitored between April and May for the presence of steelhead preparing to migrate to the ocean. However, steelhead may occur in the project reach at all times of the year and additional measures should be taken to minimize potential impacts to steelhead during the proposed period of construction (April through November).

In addition to providing passageway for steelhead, the final length of Lower Mission Creek between Yanonali Street and Cabrillo Boulevard has estuarine properties and is likely to be inhabited by tidewater gobies. The Corps has suggested that this last portion be split along its

length by a waterproof barrier and de-watered one half at a time. Construction would occur in the dry half, and the process would be repeated for the other side. It is predicted that this design would permit steelhead to pass either direction in the wet half of the channel while construction occurs in the dry half.

Avoidance of impacts to tidewater gobies

Upon completion of project design and selection of an alternative, the Corps should review the proposed action to determine whether that action may affect tidewater gobies pursuant to Section 7 of the Act. Potential impacts to tidewater gobies and avoidance measures currently proposed by the Corps are discussed below.

There is the potential for tidewater gobies to be affected directly by construction activities in the estuarine portion of Lower Mission Creek (primarily Yanonali Street to Cabrillo Boulevard). To protect tidewater gobies from construction activities, the Corps has proposed to split the creek channel lengthwise, de-water half at a time, and build channel walls in the dry half. Both ends of the area to be de-watered would be closed off with some impermeable barrier. A biologist knowledgeable of tidewater gobies would seine the entire impoundment for gobies prior to de-watering and then release the netted fish outside of the barrier. At the end of construction in the dry half, the end barricades would be withdrawn slowly to allow gradual flooding, preferably from the downstream end. The end barricades would then be moved to the other half of the channel, and the process of netting fish to safety, de-watering, and construction would begin again. However, additional measures should be implemented to avoid potential impacts to male tidewater gobies that create and protect breeding burrows in the sediments within the estuarine portion of Lower Mission Creek.

In addition to the direct impacts presented by the Corps, marginal habitat for the tidewater goby may be adversely affected by implementation of Alternative 12. At several Southern California estuaries, including Mission Creek, populations of tidewater gobies persisted through heavy flooding of 1995 (Lafferty et al. 1999). Individuals may escape moderate to high flows by burrowing or finding pockets of still water associated with vegetation and debris, which evidently is possible even in small streams with steep banks (Lafferty et al. 1999). Replacement of natural banks with concrete vertical walls in the estuarine portion of Lower Mission Creek could result in a lower probability of tidewater goby persistence through periods of flooding.

2. Impacts due to stream bottom enhancement

Construction of Alternative 12 will restore a soft, natural bottom to most portions of Lower Mission Creek or retain the soft bottom if it is already present. Impacts will result from the mechanical shaping of the bottom to remove hardened obstructions, establishment of a uniformly smooth surface, removal of existing concrete, and expansion of the conveyance channel where necessary to accommodate design features.

Potential impacts include the removal of pools present at bridge abutments, around hardened toes

of bank protection devices, and adjacent to lengths of concrete islands. Construction would result in the removal of vegetation rooted at and adjacent to the channel's edge.

In addition, the widening of Lower Mission Creek will potentially result in reduced velocity, increased sedimentation, a reduction in pool depth and increased water temperatures. Subsequently, aquatic organisms may be affected.

B. Stream Bank

Impacts to bank vegetation

Widening of the streambed and shaping the banks of Lower Mission Creek as provided in the design of Alternative 12 would result in loss of streambank vegetation, including native and exotic trees, shrubs, and herbs.

Channel construction would require removal of native trees which grow at about fifteen locations along Lower Mission Creek, mostly upstream of Highway 101. Western sycamore (*Platanus racemosa*) trees or, in some cases, clusters of trees, are located at six locations. It is not apparent upon visual observation if these clusters of trees constitute one individual or several; separate trunks may grow and originate from the same base. Just upstream of the Bath Street Bridge, there is a sycamore cluster of three trunks. The sycamore cluster located downstream of the Bath Street Bridge also consists of three trunks. At the Mason Street Bridge, there appears to be two mature sycamore trunks and two younger ones growing from the same base. Individual western sycamores grow at three other locations.

Six willows and four white alders grow on the upper banks at various locations upstream of Highway 101. A coast live oak grows just upstream of Ortega Street Bridge, and there is a cottonwood between the Cota and Haley Street Bridges.

Native trees are treated as isolated individuals whose loss must be made up, but whose ecological value has been factored into the habitat quality of existing bank vegetation. The loss of trees for Alternative 12 is estimated at 18 trees or clusters of trees, resulting in a short term loss of habitat for riparian species. The loss of mature western sycamore trees may also constitute a loss of genetic integrity within the Mission Creek drainage.

C. Operation and Maintenance

Routine maintenance of Lower Mission Creek performed by Santa Barbara County currently includes removal of debris/ sediment, removal of streambed vegetation, herbicide application, channel shaping, channel desilting, and removal of urban trash. Associated environmental impacts and mitigation measures were identified in the Program EIR and Addendum to the Program EIR for Santa Barbara County Flood Control Routine Maintenance (Santa Barbara County 1997).

Although the proposed Lower Mission Creek Flood Control Project will improve conveyance capacity and reduce damages from flooding, periodic maintenance by Santa Barbara County Flood Control will continue to be necessary. To be in compliance with Federal and State water quality requirements for future maintenance of Lower Mission Creek, Santa Barbara County will be required to submit applications for various permits, including Section 404 Corps Regulatory permit, State Section 401 Water Quality Certification, and 1603 Streambed Alteration permit. At the time of permitting review, the Service may provide additional comments on the maintenance program.

The extent, nature, and frequency of future stream channel maintenance will be an important element in the success of the habitat enhancement efforts proposed by the Corps. The Corps outlined the projected flood control maintenance regime for Alternative 12 in Section 3.5.3 of the Draft EIS/ EIR for the Lower Mission Creek Flood Control Project (U.S. Army Corps of Engineers 1999b) and the revised project description for Alternative 12 received by the Service in March of 2000.

Removal of streambed vegetation and accumulated sediments and debris from Lower Mission Creek will be implemented in a mosaic pattern of maintenance, wherein partial removal of vegetation would occur yearly. One half of the streambed would be cleared in a given year. A length of streambed would be cleared on one side of the channel, then the opposite side of the next length streambed would be cleared. In addition, removal would be required in any areas where sediment deposition occurs if more than fifteen percent of the channel capacity is deposited within the project reach.

Maintenance activities would be restricted to the months between August and late October to avoid impacts to steelhead. However, maintenance of the channel may be required between December and March in the case of a heavy storm event. In addition, steelhead may occur in the project reach at any time of the year. Measures should be taken to avoid potential impacts to steelhead due to maintenance activities conducted at any time of the year.

Even with a mosaic pattern of clearing of streambed vegetation and sediments, the proposed frequency of maintenance activities will prohibit the ability of the stream bottom to recover to a natural condition. Removal of streambed vegetation, accumulated organic materials, and sediments results in decreased habitat heterogeneity and species diversity, channel erosion, sedimentation, and an increase in invasive species. Loss of shading by streambed vegetation impacts habitat quality through increased weed and algal growth, increased water temperatures, and low oxygen levels. Increased turbidity due to frequent maintenance activities may adversely affect aquatic species.

Included in the proposed operation and maintenance activities are measures to avoid the scoured areas in the creek that may provide habitat for aquatic organisms. All pools and riffles that form in the stream channel may provide important aquatic habitat. Therefore, we recommend that sediment removal activities be conducted in a way which does not disturb any pools and riffles in the stream channel.

Bank vegetation and associated terrestrial and aquatic species will continually be disturbed as a result of entry to the creek channel for operation and maintenance purposes. All equipment should enter and leave the creek only at the four identified access ramps, which most likely will be located at Canon Perdido Street, Bath and Cota Streets, Gutierrez and de la Vina Streets, and Chapala Street, to minimize impacts to bank vegetation and associated species.

VI. HABITAT EVALUATION

Existing conditions and the environmental benefits resulting from Alternative 12 were quantified by a modified habitat evaluation procedure (HEP) which utilizes ecological characteristics of the stream channel and bank vegetation. In this type of analysis, a habitat unit is evaluated based on a Habitat Suitability Index, or a ranking of habitat quality. Table 2 outlines the ranking system for Lower Mission Creek.

For aquatic habitat evaluation of Lower Mission Creek, a habitat unit was defined by an area of 25 yards in length as wide as the existing stream channel. Habitat units for stream bank evaluation are 25 yards in length and as wide as the limits of construction. The existing habitat condition of 65 segments, each 25 yards long, between Canon Perdido and the Cabrillo Boulevard Bridge of Lower Mission Creek was evaluated according to the ranking system outlined in Table 2. This evaluation is based on pedestrian surveys in September 1997 (following channel maintenance), December 1997, and May 1999.

The details of the HEP, provided below, are based on information provided by the Corps for the Lower Mission Creek Flood Control Feasibility Study as of November 1999. Based on the information received at the time of writing this report and further discussion with the Corps, the Service generally agrees with the methodology of habitat evaluation employed, given the limitations inherent in any effort to quantify habitat value. The Corps provides documentation of the modified HEP analysis in Appendix C of the revised Lower Mission Creek Flood Control Feasibility Study and Draft EIS/ EIR (1999b).

Future habitat value of Lower Mission Creek was projected for each year, beginning at the end of project construction, over the lifetime of the project (determined by the Corps to be 50 years). In estimations of habitat value over this period of time, each habitat unit along Lower Mission Creek was treated equally.

Habitat values for each year of the 50-year project were constructed based on growth dynamics of riparian understory and canopy plants. It was assumed that the riparian canopy species planted on the rip-rap stabilized slopes and in habitat expansion zones would reach maturity 30 years following project completion. Similarly, understory species are expected to be well-established 15 years after completion of project construction. Plants will tend to grow faster in the years immediately following project completion than upon reaching maturity, and the habitat evaluation values incorporate the expected decline in plant growth rate over time to maturity.

For each year of the project, a habitat suitability index (HSI) arising from planting of native species on rip-rap stabilized banks and habitat expansion zones was calculated by including ecological relationships of the riparian community. The influences of canopy and understory species on each other and themselves are incorporated by structural complexity factors. These factors were combined, resulting in an enhancement factor pertinent to species which compose the understory layer and an enhancement factor pertinent to canopy species. A second computation incorporated a regional factor, which reflects the influence of climate, soil quality, and water availability on growth and proliferation of species, yielded a measure of the quality of understory and quality of canopy. Finally, a HSI for each year was computed from these values and the previous year's HSI.

Calculations of habitat units provided by Alternative 12 are annualized, average values to account for the inherent lag in growth of the created riparian community. For each enhancement action, the habitat index was projected to increase incrementally until the year at which maximum habitat index is achieved. From that point until year 50, the habitat index was considered to remain constant. To calculate total habitat units provided by the specific enhancement action, the habitat index was averaged over 50 years and multiplied by the amount of affected area (measured in habitat units).

VII. MITIGATION PLAN

The Service's Mitigation Policy (Federal Register 46[15]:7644-7663) provides guidance for the formulation of measures to offset adverse project impacts. The purpose of the policy is to foster consistent and effective Service recommendations, to allow developers to anticipate Service recommendations, and to reduce Service-developer conflicts and project delays. The policy is based on two principals: 1) that impact avoidance or compensation be recommended for the most valued resources, and 2) that the degree of mitigation correspond to the value and scarcity of the impacted resources.

To apply these principles to project planning, each of the affected habitats is classified into one of four resource categories of varying importance to fish and wildlife resources. The most valued and scarcest habitats are Resource Category 1, whereas the least valued and most abundant habitats are Resource Category 4. Mitigation planning goals of decreasing stringency correspond to the resource categories of decreasing relative importance.

In addition, the Mitigation Policy recommends the use of the following sequence of steps in the mitigation planning process. Initially, project planning should attempt to ensure that adverse impacts to fish and wildlife are avoided or minimized as much as possible. Next, impacts should be mitigated through the repair, rehabilitation, and restoration of the affected environment. In some instances, however, "unavoidable" impacts will remain in spite of the best planning efforts. In those instances, compensation for unavoidable impacts is the last step to be considered and should only be used after the previous steps have been exhausted.

As identified in the previous Coordination Act Report (U.S. Fish and Wildlife Service 1994), the

Service designates wetland (riparian and estuarine) habitats of Lower Mission Creek as Resource Category 2. These designations are based on the relative scarcity of riparian and estuarine habitats due to continuing and historic loss of wetlands and their high value to wildlife. The Service's mitigation goal for Resource Category 2 habitats is no net loss of habitat value while minimizing loss of in-kind habitat value.

To mitigate for impacts resulting from implementation of Alternative 12, the Corps has proposed the following project design features (described in Section VIII): improvement of channel bottom by removing concrete; installation of energy dissipaters made from fields of protruding rock; planting of native trees and shrubs into riprap slopes above the stream channel; creation of habitat expansion zones, and; abatement of *Arundo*.

According to the modified HEP implemented by the Corps, implementation of the above features is expected to mitigate for the expected project impacts. The projection of future ecological value of Lower Mission Creek without construction of a flood control project is 1.29 habitat units. The projection of ecological value 30 years after implementation of Alternative 12 is 1.33 habitat units. Therefore, the Corps has proposed that the project design features included in Alternative 12 would, in the long term, adequately mitigate for the impacts due to project implementation.

While the proposed project design features would contribute to the enhancement of habitat along Lower Mission Creek, additional measures will likely be necessary to adequately offset impacts resulting from Alternative 12. Additional potential impacts include the loss of habitat for aquatic invertebrate and fish species provided by natural banks, which will result from the application of vertical concrete walls in much of the project reach downstream of Highway 101. Annual stream channel maintenance of Lower Mission Creek will likely result in decreased ecological value of the streambed and will lower the likelihood of success of proposed habitat enhancement efforts; these impacts have not been adequately factored in the modified HEP analysis. Additional measures will be necessary to avoid or mitigate (if unavoidable) direct and indirect impacts to habitat for steelhead and tidewater goby.

The projected ecological value with implementation of Alternative 12 includes benefits due to the creation of several habitat expansion zones, which is dependent upon the acquisition of land along Lower Mission Creek. If the selected land parcels become unavailable for creation of habitat expansion zones, future ecological value with implementation of Alternative 12 should be redetermined to reflect the actual extent of projected habitat enhancement. If ecological benefits due to creation of habitat expansion zones are less than anticipated, then additional mitigation measures should be developed.

We recommend that the mitigation plan include an adequate maintenance and monitoring program in order to ensure success of habitat enhancement efforts. Success criteria and performance measures should be developed for the 5- year maintenance plans for *Arundo* abatement, native vegetation planted on rip-rap stabilized slopes, and habitat expansion zones. Additional mitigation measures should be taken if the success criteria are not met. Likewise, the

success of the rocky energy dissipaters and natural stream bottom in enhancing ecological value of Lower Mission Creek should be monitored, and mitigation measures adjusted as necessary.

VIII. PROJECT DESIGN FEATURES

A. Natural stream bottom

Existing stream bottom surfaces will be replaced with a natural, soft bottom composed of native sediments throughout the length of the project area, except immediately underneath bridges and through the oxbow south of Highway 101. Actions to achieve restoration of natural stream bottom include mechanical shaping of the bottom to remove hardened obstructions, establishment of a uniformly smooth surface, and removal of existing concrete.

These actions will possibly result in an expansion and improvement of habitat conditions. More area would be available for habitat as structures and concrete would be removed from the channel. Restoration of a natural stream bottom may promote the ecological functions typically observed in the benthic community of creeks. In addition, stream bottom restoration may increase species richness, one indicator of ecological health (McGoogan and Bose 1999). However, given the proposed channel maintenance regime, the stream bottom will not be allowed to recover to a natural or ecologically stable condition.

The amount of human debris and resulting contamination of the biological resources will be reduced due to the concurrent removal of accumulated urban flotsam and jetsam such as automobile batteries, shopping carts, bicycles, water heater tanks, and fuel canisters. An additional benefit of removal of hazardous debris may be improved passage for steelhead.

B. *Rocky energy dissipaters*

Energy dissipaters consisting of embedded fields of large boulders would create stretches of turbulent water with pools, strong riffles, backwaters, and other heterogeneous characteristics of the flow. These boulder fields would be installed at two reaches of Lower Mission Creek; roughly between Canon Perdido Street Bridge to just downstream of De la Guerra Street Bridge, and between Haley Street Bridge and the oxbow. The Service concurs that installation of sizable rocks arranged to disrupt fast laminar currents would provide ecological attributes including diverse current patterns, eddies below rocks, pockets of still water, and similar traits found naturally in rocky sections of stream courses. Populations of aquatic insects such as mayflies and caddis flies would be expected to colonize the waters around the dissipaters and thus enhance the ecological integrity of Lower Mission Creek.

C. Native revegetation along sloped stream banks stabilized by riprap

Where feasible, the creek banks of Lower Mission Creek will consist of a combination vertical wall and riprap sideslope. Concrete pipes in varying sizes (up to a maximum three feet in

diameter) will be placed in between the riprap to allow planting of native trees and vegetation. Species of riparian trees, including Western sycamore, cottonwood, and coast live oak, will be planted from 1 gallon nursery stock into cylindrical planters embedded within the riprap and spaced 40 feet apart.

Willow branches will be placed into prepared soil below the riprap in dense rows with the expectation that approximately 20% will sprout vegetatively and find their way through gaps in the riprap. Other native understory species, including arroyo willow, Mexican elderberry, and coyote brush will be seeded into the top soil, or set out from liner stock.

Planting of willows as proposed is considered a successful riparian restoration and slope stabilization technique for riparian zones of Southern California (Reiger pers. comm. 1999). Although the success of specific restoration actions is variable and site-dependent, we concur that this detail in the stream bank design will result in greater habitat value at Lower Mission Creek. A 5-year maintenance plan for native vegetation planted on rip-rap stabilized slopes will be implemented to promote the success of revegetation efforts.

Combination rip-rap and vertical wall will be the dominant bank treatment upstream of Highway 101, except in two short reaches just upstream of Haley- De la Vina Bridge and De la Guerra Bridge. Below Highway 101, the combination riprap and vertical wall will be applied along the southeast bank, starting from midpoint between Chapala Bridge and Mason Bridge down to midpoint between Mason Bridge and State Bridge. In total, approximately 1425 yards of Lower Mission Creek will be finished with the combination vertical wall and riprap sideslope design.

D. Habitat Expansion Zones

Alternative 12 includes the planting of trees native to coastal California on four small parcels, ranging in size from 0.03 to 0.11 acres, along Lower Mission Creek. Development of stands of mature native trees in created habitat expansion zones would restore important islands of riparian canopy at irregular intervals along the creek's bank. Native trees, including western sycamore, cottonwood, coast live oak, California laurel, hollyleaf cherry, and white alder, planted in these areas would likely provide habitat for wildlife. A 5-year maintenance plan for native vegetation planted in habitat expansion zones will be implemented to promote the success of revegetation efforts.

While the created canopy is not likely to completely span the entire width of the creek, in time a continuous canopy of native trees will cover a portion of the creek and provide shaded habitat for aquatic and riparian species. Clusters of large native trees may provide habitat for bats known to roost in trees [red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), and California myotis (*Myotis californicus*)] as well as migratory birds (Collins pers. comm.1999).

In addition, a vacant property of about 0.6 acres located along the upper oxbow, just upstream of Highway 101 and bounded by De la Vina Street on the west and Gutierrez Street on the north (Figure 1), may be suitable for revegetation with native riparian species. However, this parcel

was once the site of a dry cleaning establishment and is known to be contaminated with perchlorethylene (PCE), a solvent used in the dry cleaning of fabric (U.S. Army Corps of Engineers 1999). Creation of a habitat expansion zone at this site will be dependent upon the cleanup of PCE, a toxic substance that is known to be carcinogenic in animals. The Environmental Protection Agency currently classifies PCE as a probable human carcinogen.

E. Arundo abatement

Arundo has many adverse traits, including the suppression of germination of native plants, rampant vegetative propagation by the dispersion of fragments of canes, proclivity to choke stream channels completely, virtual absence of foraging and nesting habitat for native animals, and a propensity to burn very intensely (Bell 1993). *Arundo* has established itself as one of the primary threats to native riparian habitats in the western United States.

Removal of *Arundo* is considered to be an important component of riparian restoration. According to Gary Bell of The Nature Conservancy, the best way to address habitat loss in southern California riparian systems is through a comprehensive program of eradication of *Arundo*, and other invasive exotics, and relying on natural processes for the recovery of native natural communities and species (Bell 1997). Southern California watersheds retain flood regimes sufficient to move and sort sediment and extensive sources of seed and vegetative propagules for *Salix* and other native riparian plants. Native communities of major riparian corridors (and thus riparian-dependent species) may be limited, not by the capacity of the community to regenerate, but by the capacity of native species to compete with aggressive invasive exotic species, primarily *Arundo* (Bell 1997).

Arundo would be removed along with other stream channel/ bank vegetation in the project area as a result of excavation activities associated with Alternative 12. In addition, *Arundo* would be eradicated from 0.75 additional acres of Mission Creek, including areas regions as far upstream as Oak Park. Foliar applications of glyphosates would be the principle means of suppressing *Arundo*. Removal and treatment of *Arundo* would be maintained for five years.

In order to effectively control the re-invasion and dominance of *Arundo* in Lower Mission Creek, a watershed-based approach to *Arundo* eradication will need to be considered. Reinfestation of treated downstream sites from upstream sources would be detrimental to the native revegetation efforts proposed for Lower Mission Creek. *Arundo* removal in the lower watershed may not be effective unless additional efforts are made to eradicate *Arundo* from the upper drainage of Mission Creek.

F. Enlargement of sloped planting areas

Bank topography at two (and possibly three) locations enables shaping the bank from grade level to the stream channel in either a benched or continuous manner; no confining concrete walls would be necessary here. Native trees could be planted directly above the channel and leave sufficient room for periodic channel maintenance. Appropriate understory vegetation planted

upslope would contribute to the structural and functional aspects of the riparian community. The sites of sloped planting areas would be part of the habitat expansion zones at: (1) the right hand bank (facing downstream) just above the De la Guerra bridge; (2) the left hand bank (and partial right hand bank) between Ortega Street bridge and Bath Street bridge, and; (3) potentially, the right bank at the beginning of the oxbow (upstream of Highway 101).

IX. RECOMMENDATIONS

The Service agrees that of the flood control alternatives presented by the Corps, Alternative 12 will enhance existing habitat at Lower Mission Creek. The Service proposes the following recommendations for implementation of Alternative 12.

A. *COORDINATION*

1. Upon completion of project design and selection of an alternative, the Corps should consult with the Service pursuant to Section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (Act) regarding tidewater gobies. The Corps should also consult with NMFS pursuant to Section 7 of the Act regarding Southern California steelhead and passage requirements.

2. The Corps should work with NMFS to design the oxbow bypass in such a way that there will be no impediments to steelhead passage.

3. The Corps should continue to coordinate with the Service and CDFG in the creation, enhancement, and maintenance of riparian and estuarine habitat.

4. The Corps should coordinate with local entities regarding relevant plans and projects at Lower Mission Creek.

B. *AVOIDANCE OF IMPACTS TO WILDLIFE*

1. Removal of native trees should not be scheduled during the nesting season, approximately January to September (depending on the bird species), to avoid displacing nesting and migratory birds. Prior to removal of trees, a qualified surveyor should investigate which species of birds are utilizing the trees as nesting habitat. The Corps should then confer with the Service and CDFG to determine the appropriate course of action.

2. Prior to construction, a qualified biologist should survey the Lower Mission Creek project area for bats. Once a bat survey is completed, replacement of bridges should be scheduled to avoid displacing roosting and migratory bats.

3. Bridges to be replaced along Lower Mission Creek should be designed to maximize potential bat roosting habitat. Table 3 describes the species of bats which would likely benefit from such bridge design and the specific roosting preferences of each. For more information and details on bridge design to accommodate bats, refer to *Bats in American Bridges* (Keeley and Tuttle 1999).

C. *REVEGETATION PLAN*

1. A wide variety of native canopy and understory species should be planted to promote ecological diversity and complexity. In addition to those already included in the design of the project, the following species should be considered in the revegetation plan: big leaf maple (*Acer macrophyllum*), toyon berry *(Heteromeles arbutifolia*), lemonade berry (*Rhus integrifolia*), Douglas nightshade (*Solanum douglasii*), mugwort (*Artemesia douglasiana*), coast goldenbush (*Isocoma menziesii*) and mulefat (*Baccharis salicifolia*).

2. In order to help protect revegetated areas and possibly discourage the use of Lower Mission Creek by humans, the following native species are suggested for planting along the upper portion of the banks: Fuchsia-flowered gooseberry (*Ribes speciosum*), California blackberry (*Rubus ursinus*) and California rose (*Rosa californica*) (Stephanie Langsdorf pers. comm.1999).

3. Trees and plants included in the revegetation efforts should be grown from seed stock native to South Coast of Santa Barbara County, and when possible, from the Mission Creek Watershed. There are several local growers of native plants.

4. Willow cuttings to be planted should be collected locally (i.e., South Coast watersheds). One option is collection of willows from a current restoration project conducted by Santa Barbara County Flood Control along Atascadero Creek (Spencer pers. comm. 1999). Santa Barbara Flood Control would need to be contacted for access to this site.

5. Willow cuttings should be planted within 24 hours of harvesting. If this is not possible, willows should be kept covered and wet and then planted as soon as possible (Spencer pers. comm. 1999). To sprout vegetatively,

willow branches will require water at least through the initial shock of planting. The Corps should coordinate with biologists at Santa Barbara Flood Control District for the latest techniques in this method of bank stabilization.

6. Irrigation of planted trees should be conducted by a drip-line method in order to promote the growth of native species and to reduce the invasion of exotic species.

7. Revegetation efforts in the enhancement of habitat should include an adequate monitoring and maintenance plan. Within these plans, success criteria should be developed. Secondary measures should be developed and implemented if the success criteria are not met.

8. To ensure success of the revegetation efforts, the 5-year maintenance plan included in the project design should contain provisions for the removal of non-native vegetation in addition to irrigation.

D. RIP-RAP STABILIZED SLOPES

1. Topsoil should be distributed through or layered into the interstices of the riprap over time to ensure that the soil is compacted and does not does not get washed away during high flows (Reiger pers. comm. 1999).

2. Although native trees will be spaced 40 feet apart (as determined by constraints in the engineering design of the channel), tree species should be arranged in as natural and random manner as possible. In other words, there should not be a specific and predictable pattern of species of trees along the banks of the creek.

E. ARUNDO ABATEMENT

1. Effective treatment of established *Arundo* is killing of the root mass, which requires treatment of the plant with systemic herbicide. To ensure effective translocation of herbicide to the roots, *Arundo* should be treated by foliar application of a two-to-five percent (2-5%) solution of glyphosate (Rodeo®), applied post-flowering and pre-dormancy (mid-August to early November) at a rate of 0.5 to 1 Liters/ hectare (Bell 1997).

2. We recommend that glyphosate application be conducted 25 feet from any water body. Glyphosate may be applied to *Arundo* rooted within the channel and on the banks of Lower Mission Creek when the streambed is dry. Herbicide should not be applied if there is any chance of runoff to the creek, specifically if rain is forecasted within 24 hours.

3. Two to three weeks after foliar treatment, treated stems and leaves brown and soften, and the stems have little or no potential for rooting and are brittle. They may be left intact on the ground or chipped in situ for mulch, or removed if necessary for flood control or establishment of native vegetation (Bell 1997).

4. If *Arundo* is removed prior to herbicide treatment, foliar application would not be required, and less systemic herbicide would be exposed to Lower Mission Creek. After removal of *Arundo*, cut stems should be treated with concentrated glyphosate, applied surgically within one to two minutes in order to ensure tissue uptake (Monsanto 1989). This treatment is most effective at the post-flowering stage.

5. In addition to mitigation requirements, *Arundo* which will be removed from the stream channel and banks as a result of excavation activities associated with Alternative 12 should be treated with glyphosate to reduce the further spread of *Arundo*. Approximately four weeks prior to excavation, *Arundo* should be treated by foliar application of glyphosate or by the cut-stem technique following removal. Two weeks later, treatment with glyphosate should be repeated if necessary.

6. In order to effectively control the re-invasion and dominance of *Arundo* and to promote success of revegetation efforts in Lower Mission Creek, it will be necessary to remove *Arundo* from more than 0.75 acres. To prevent re-invasion of treated downstream sites from upstream sources, *Arundo* should be removed from the upper portion of the watershed (Bell 1997). It is suggested that the Corps coordinate with local agencies and organizations on the location of *Arundo* removal. When possible, provisions for additional *Arundo* removal should be incorporated into any efforts to enhance the habitat and ecological value of Mission Creek.

7. You should refer to exotic plant control organizations for the most recent advances in *Arundo* removal techniques.

8. The program for *Arundo* removal should include an adequate monitoring and maintenance plan. Within these plans, success criteria should be developed. If the success criteria are not met, secondary measures should be developed and implemented

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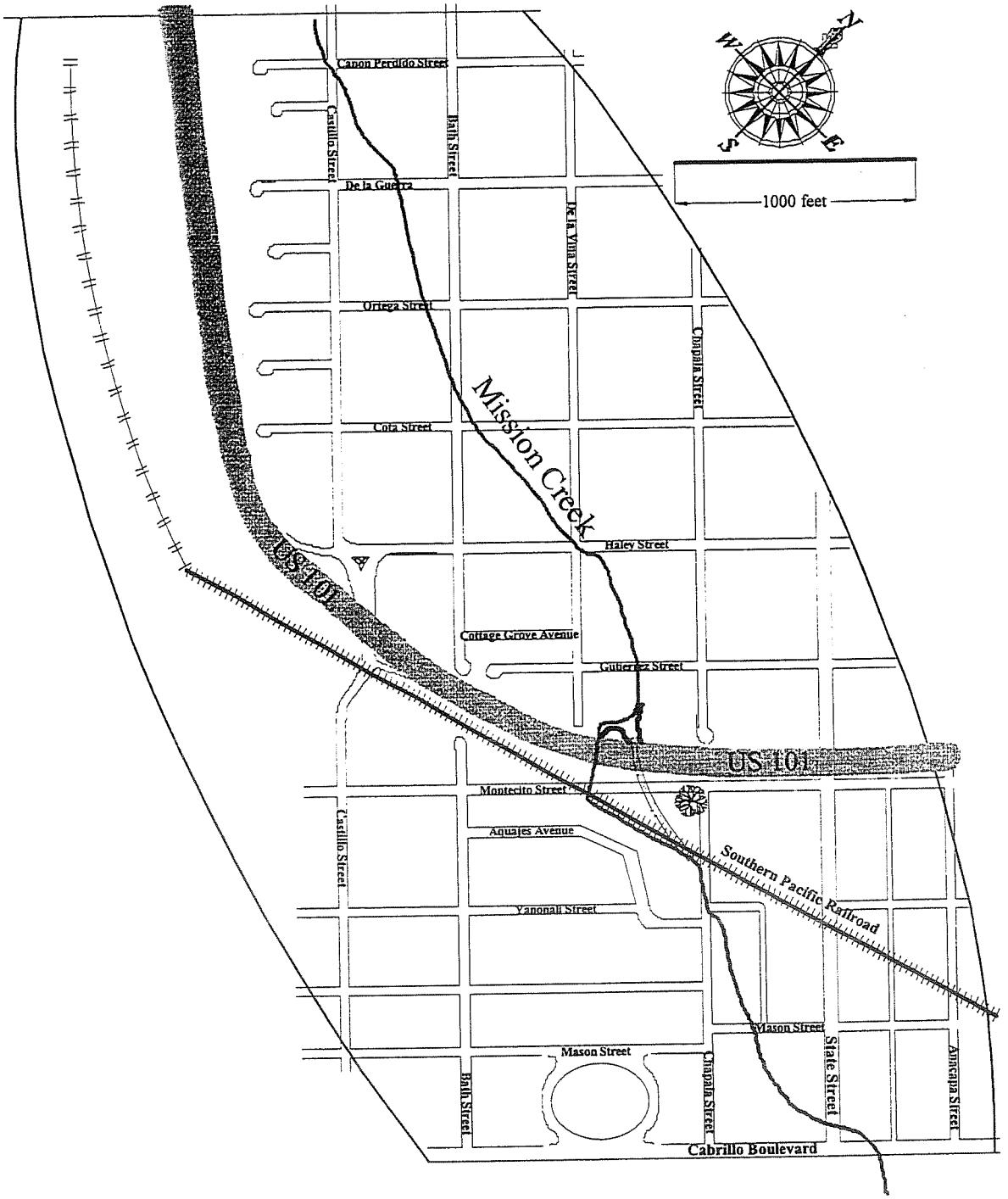

FIGURE 1
PROJECT AREA LOCATION MAP*
Lower Mission Creek Flood Control Feasibility Study
Santa Barbara County, California
**Provided by U.S. Army Corp of Engineers*

TABLE 1
FEDERALLY ENDANGERED OR THREATENED SPECIES THAT MAY OCCUR IN THE PROJECT AREA
Lower Mission Creek Flood Control Feasibility Study
Santa Barbara County, California

Species	***Listing Status***
FISHES	
Tidewater goby (*Eucyclogobius newberryi*)	FE, CSC
Steelhead trout (*Oncorhynchus mykiss*)	FE, CSC
AMPHIBIANS	
California red-legged frog (*Rana aurora draytonii*)	FT, CSC
BIRDS	
Brown pelican (*Pelicanus occidentalis*)	FE, SE
Western snowy plover (*Charadrius alexandrinus nivosus*)	FT, CSC
California least tern (*Sterna antillarum browni*)	FE, SE

FE Federally endangered
FT Federally threatened
SE State endangered
ST State threatened
CSC California species of special concern

TABLE 2
U.S. ARMY CORPS OF ENGINEERS' RANKING SYSTEM FOR HABITAT EVALUATION*
Lower Mission Creek Flood Control Feasibility Study
Santa Barbara County, California

Numeric ranking	Stream bottom conditions	Bank vegetation conditions
1	pristine stream bottom	pristine lowland riparian gallery
0.7- 0.9	soft bottom reverting by stream flow to natural topographic relief of scour pockets and rocky outcrops	nearly contiguous canopy without natural understory, or contiguous shrubby understory without canopy
0.5	soft bottom, originally manufactured, but then left unmaintained for several years	isolated, large native trees
0.3	soft bottom periodically scraped but retaining a few small relief features, natural or man-made	contiguous, weedy and opportunistic understory
0.2	soft bottom periodically scraped mechanically to remove surface features	patches of weedy growth separated by hardened revetments
0.1	concrete bottom with accumulated sediments and urban refuse	small and isolated patches and intervening voids
less than 0.1	bare concrete bottom	nearly solid bank revetments

**From Preliminary EIS/ EIR for Lower Mission Creek Flood Control Project. U.S. Army Corp of Engineers 1999.*

TABLE 3
BATS LIKELY TO USE URBAN STRUCTURES AS ROOSTING HABITAT (based on known preferences)*
Lower Mission Creek Flood Control Feasibility Study
Santa Barbara County, California

Common Name	Scientific Name	Documented bridge/ culvert use	Potential use	Roost type: crevices/open beams	Preference
+Pallid bat	*Antrozous pallidus*	yes	—	crevice	1 to 1.5 inches
+Townsend's big-eared bat	*Corynorhinus townsendii townsendii*	yes	—	open	sheltered spaces
California myotis	*Myotis californicus*	no	yes	—	—
Big brown bat	*Eptesicus fuscus*	yes	—	crevice	0.75 to 1.5 inches
Mexican free-tailed bat	*Tadarida brasiliensis*	yes	—	crevice/open	0.5 to 1.25 inches

+California Species of Special Concern

**From Bats in American Bridges* <http://www.batcon.org/bridge/ambatsbridges/index.html>
Brian W. Keeley & Merlin D. Tuttle, 1999.

APPENDIX - B - 1

FINAL BIOLOGICAL OPINION

LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY
NATIONAL MARINE FISHERIES SERVICE
SOUTHWEST REGION
501 WEST OCEAN BOULEVARD, SUITE 4200
LONG BEACH, CALIFORNIA 90802
AUGUST 2000

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

AUG 2 2000

In Your Response
Please Refer to:

F-LB-00-23:KAJ

Robert E. Koplin
Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Dear Mr. Koplin:

This document transmits the National Marine Fisheries Service's (NMFS) biological opinion based on NMFS' review of the Army Corps of Engineers' (ACOE) project to construct and the County of Santa Barbara (County) project to maintain a flood control channel on lower Mission Creek in the City of Santa Barbara, Santa Barbara County, California, and their effects on the Federally endangered Southern California Evolutionarily Significant Unit (ESU) of steelhead (*Oncorhynchus mykiss*) and its critical habitat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Formal consultation for the Mission Creek flood control project was initiated on June 20, 2000.

The NMFS contact for this project is Korie Johnson. Please contact her at (562) 980-4199, if you have any questions regarding this consultation.

Sincerely,

Rodney R. McInnis
Acting Regional Administrator

BIOLOGICAL OPINION

AGENCY: United States Army Corps of Engineers

ACTION: Construction and maintenance of flood control channel on lower Mission Creek, Santa Barbara County, California

CONSULTATION CONDUCTED BY: National Marine Fisheries Service, Southwest Region

DATE ISSUED: AUG. 2, 2000

I. INTRODUCTION

Lower Mission Creek and its associated floodplain is highly constrained by residential and commercial development. Thus, streamflow often overtops the creek embankments during heavy storms, resulting in extensive flooding. The City has experienced approximately 20 damaging floods since 1900. In 1995, flooding resulted in extensive damage to City and private property, numerous evacuations of residents living within the immediate floodplain of Mission Creek, and transportation delays. Due to the recurrent flooding, the City of Santa Barbara (City) and the Santa Barbara County Flood Control District (County) requested that the Army Corps of Engineers (ACOE) assist the City in finding a solution to the flooding problems. In response to this request, ACOE has proposed the construction and maintenance of a flood control channel along the lower 1.2 miles of Mission Creek in the City of Santa Barbara, Santa Barbara County, California.

During early planning stages of this project, NMFS staff attended multiple site visits and agency coordination meetings. During these early meetings, NMFS informed the ACOE of steelhead concerns regarding the proposed project. On December 21, 1999, NMFS received a feasibility report for the ACOE's project along with a request for formal consultation. At that time, however, completed descriptions of construction and maintenance activities were not available. Thus, NMFS requested further project information, including detailed project plans, proposed maintenance activities, hydraulic analyses, cross sections and profiles of the project reach, and an analysis of possible effects to steelhead. At a June 7, 2000 meeting, ACOE presented the requested information and asked for further input from NMFS. On June 20, 2000, the final Biological Assessment, project description and hydraulic analyses were received by NMFS and formal consultation on endangered steelhead and steelhead critical habitat was initiated in accordance with section 7 of the Endangered Species Act (ESA).

This biological opinion, therefore, represents formal consultation for the Southern California ESU for the Federally endangered steelhead and for designated steelhead critical habitat. A complete administrative record is on file at NMFS

Southwest Region Office (501 W. Ocean Blvd., Suite 4200, Long Beach, CA 90802-4213).

II. Description of the Proposed Action

Introduction

The Federal action involves the Army Corps of Engineers (ACOE) constructing a flood control channel along 5380 linear feet (ft) of lower Mission Creek beginning at the Canon Perdido Street Bridge and continuing downstream to the Cabrillo Boulevard Bridge within the estuary (Figure 1). The purpose of the project is to increase the capacity of lower Mission Creek from 1050 cubic feet per second (cfs) to 3,400 cfs in order to provide flood protection up to a 20-year storm event. Once the project is constructed, the County would be responsible for maintaining the channel at the design capacity.

Action Area

The action area for the ACOE lower Mission Creek flood control project includes approximately 5500 linear feet of Mission Creek, including the channel invert and both embankments from Canon Perdido Street down to Cabrillo Boulevard near the mouth. Mission Creek is part of the Southern California Evolutionarily Significant Unit (ESU) for the Federally endangered steelhead (*Onchorynchus mykiss*) and was designated by NMFS as steelhead critical habitat on February 16, 2000.

Proposed Action

Overview

Generally, the ACOE project involves widening the channel, lining the embankments with vertical concrete walls, streamlining the bedslope, installing a bypass culvert near the Highway 101 crossing (referred to as the oxbow), and replacing four bridges (Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges) in order to accommodate increased channel capacity (Figure 1). Five properties along the creek channel will be purchased by the ACOE, and existing buildings on those properties will be removed for the widening of the creek. The remainder of the parcels would be used in the creation of isolated park areas, referred to as habitat expansion zones. The parcels range in size from 0.03 to 0.52 acres. Native trees, including western sycamores, cottonwoods, and coast live oak will be planted in these parks and along creek embankments to provide an expanded riparian corridor.

In order to widen and stabilize the channel, ACOE will remove existing bank stabilization structures, excavate embankments, and install hard bank slope protection. A total of 82,000 cubic yards of material will be excavated from the

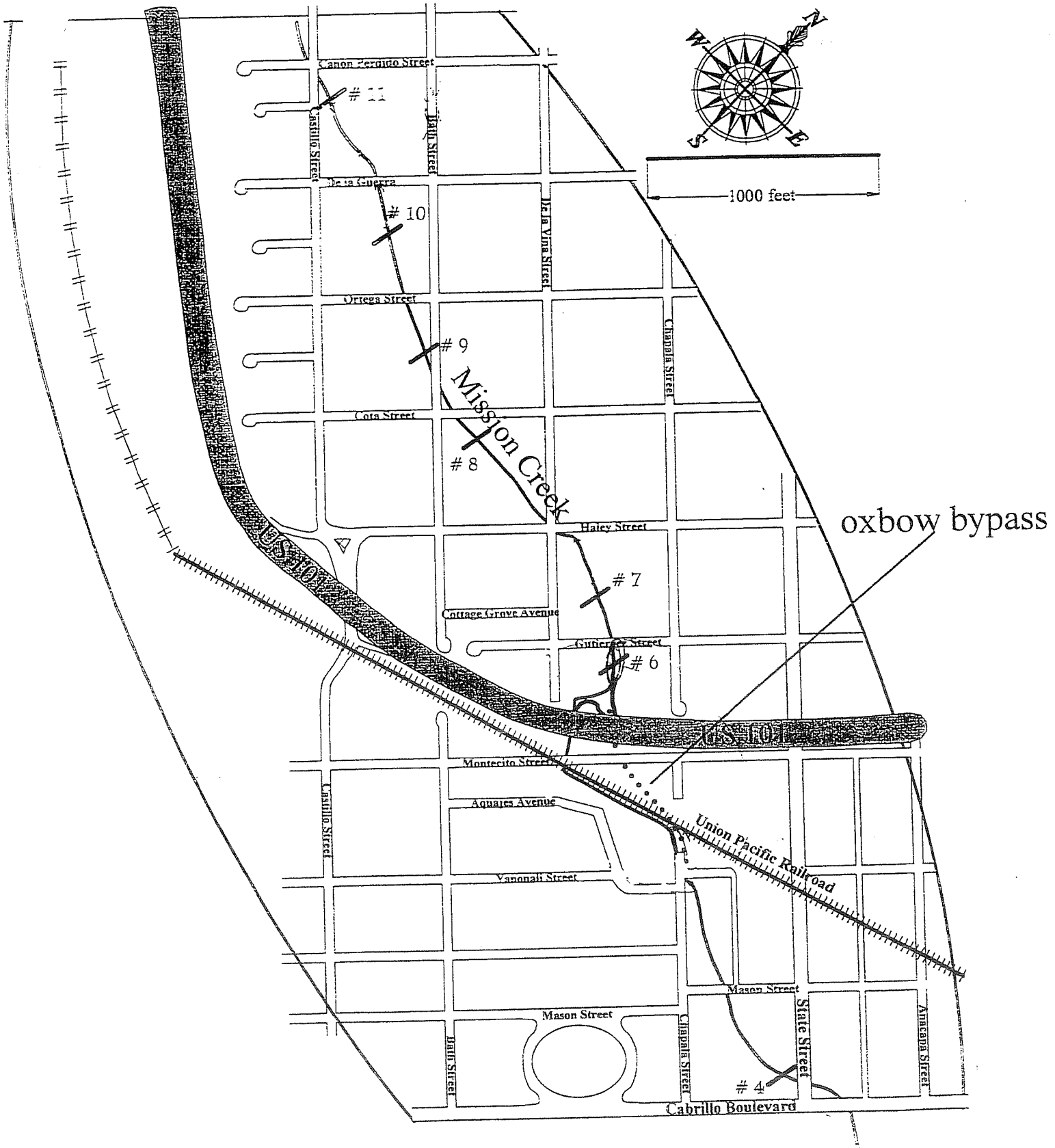

Figure 1. Project area for Army Corps of Engineers Flood Control Project along lower Mission Creek in the City of Santa Barbara, Santa Barbara County, California. Numbered lines indicate locations of representative cross sections used in hydraulic analyses.

creek channel and embankments. Only the retaining wall located on the eastern bank upstream of the De la Guerra Bridge and the hard bottom channel and mortared sandstone walls (approximately 940 linear ft) located between the upstream side of Highway 101 and the downstream side of Chapala Street, referred to as the "oxbow," will be left in place. Approximately 420 linear ft of existing cement channel located between Haley and De la Vina Street bridges will be removed.

Hard bank slope protection will consist of either complete vertical cement walls or combination vertical toe wall and vegetated riprap sideslope (Table 1). Walls will be constructed in one of two methods, depending on their proximity to existing structures. An inverted "T" footing would be applied in areas where sufficient rights-of-way are available. In areas with limited rights-of-way, a pier footing construction would be used. In general, the toe wall height will be half the depth of the channel. The remaining top half of the bank will be the riprap side slope. Between successive bridges the toe walls will be of constant height and therefore the height of the riprap slope could vary somewhat. The side slope will be constructed by backfilling the vertical wall with riprap at a maximum slope of 1.5:1. The riprap will be covered with topsoil and planted to establish a healthy riparian corridor. Short cylinders will be placed in between the riprap to allow planting of native trees and vegetation. Following project implementation a total of 2395 linear feet will be vertical wall and 4490 linear feet will be vertical wall-riprap sideslope.

Table 1. Overview of modifications to lower Mission Creek channel and embankments.

Reach	Upstream Extent	Proposed Treatment Left Bank	Proposed Treatment Right Bank	Proposed average depth	Proposed width (channel invert)	In-Channel Modifications
1	Canon Perdido	Wall/riprap Vertical wall	Wall/riprap Vertical wall	7.5	42	Boulder cluster, fish baffles & ledges
2	De la Guerra	Wall/riprap Vertical wall	Wall/riprap	9	42	Boulder cluster, fish baffles & ledges
3	Ortega	Wall/riprap	Wall/riprap	9	42	fish baffles
4	Bath	Vertical wall	Access ramp	9	42	fish baffles & ledges
5	Cota	Wall/riprap Vertical wall	Wall/riprap Vertical wall	9	42	
6	Haley-De la Vina	Wall/riprap Vertical wall	Wall/riprap	9	50	Boulder cluster, fish baffles & ledges
7	Gutierrez	Wall/riprap Culvert inlet	Wall/riprap Riprap	9	50	Boulder cluster
8	Highway 101	Bypass culvert Oxbow	Bypass culvert Oxbow		33-40 (no change)	Boulder cluster
9	Chapala/ Yanonali	Wall/riprap Vertical wall	Vertical wall	7.5	60	fish baffles & ledges

10	Mason	Wall/riprap Vertical wall	Vertical wall	8	60	fish baffles, vertical ridges, ledges
11	State to Cabrillo	Wall/riprap	Wall/riprap	9	60	fish baffles, vertical ridges

An overflow box culvert will be installed at the oxbow. During this stretch, the creek makes several sharp turns as it crosses Highway 101, the Montecito Street Bridge, and Union Pacific Railroad. The culvert will have two 15 ft wide by 6 ft high boxes and will follow a direct path between the Gutierrez and Chapala Street Bridges. A weir structure will be built at the inlet of the culvert to direct all flows up to 640 cfs through the oxbow channel. If flows increase above 640 cfs, the weir will split flows between the overflow culvert and the oxbow channel. At a design flow of 3400 cfs, 2350 cfs will be directed through the culvert and 1050 cfs will flow through the oxbow. The weir will be approximately 3 ft higher than the channel invert and will be 240 ft in length, extending about 22 ft laterally into the channel.

Fish habitat

ACOE has incorporated a number of measures into the design of the flood control channel to provide cover and resting areas for steelhead. In order to dissipate high velocities and allow for improved migration of steelhead, the creek channel will be lined with riprap (up to 15 inches in diameter) at three locations. At two locations, clusters of 6 to 9 large boulders will be keyed into the riprap within the channel to break up the principal currents. Boulders will be 3 to 4 ft in diameter and placed 5 to 8 ft apart. Individual boulder fields will be 300 ft in length. One will be centered at the De la Guerra Street Bridge (starting150 feet upstream and running 150 feet below the bridge). The second would be located from 150 feet upstream of the Gutierrez Street Bridge downstream to the start of the oxbow. The outlet of the overflow culvert will be armored with riprap to prevent scouring of the streambed, but will not have boulder clusters.

ACOE will also incorporate structures into the vertical concrete walls to provide cover, shade and resting areas for steelhead. Between Mason Street and Cabrillo Boulevard, molded ridges extending vertically along the wall will lower water velocity and create localized eddy currents, providing refuge for small fish. These ridges will mostly benefit gobies, but could provide cover for young-of-the-year steelhead as well. Ridges will begin at the bottom of the formed wall and continue vertically to the ordinary high water mark, a height of approximately 8 ft at the estuary. They will vary in length from 1 to 4 feet, and will be 6 inches wide and extend 3 inches out from the wall. The space between successive ridges will be 12 inches.

In addition, artificial overhangs will be cantilevered from the wall extending 2 ft into the channel. The ledges will be 6 inches thick and approximately 50 ft long.

Within the estuary, ledges will be built approximately 10-20 inches above the invert of the stream so that water will cover the ledges at all times except at the lowest low tides. Double rows of coarse boulders (baffles) will be keyed into the channel between the overhangs along the creek walls. Spaces in between the rocks will provide additional cover and heterogeneity to the channel invert. These boulder side baffles will extend 5 ft into the channel and project 18 to 24 inches above the creek invert. A space of approximately 5 ft to 8 ft will be left between pairs of rocks to facilitate periodic removal of sediment.

The combination of all three of the above features will be incorporated into the channel and channel walls within the estuary between Mason and Cabrillo bridges. In this estuarine section of the creek, boulders would be packed together as tightly as possible. Features will be offset, so that ledges on one bank of the creek face ridges and boulders on the opposite bank of the creek. This will result in a total of 380 linear ft of fish ridges and boulders, and 240 linear feet of over hanging ledges on the eastern bank of the creek, and 360 linear feet of ridges and boulders, and 300 linear ft of ledges on the western bank of the creek.

Upstream of the Mason Street Bridge, overhangs will be placed at locations where currents are expected to impinge against the wall and scour persistent pools under the ledges. Four ledges will be built along the eastern bank for a total of 200 linear ft. Five ledges will be built along the western bank for a total of 250 linear ft. Ten rock baffles will be constructed in lower velocity sections of the creek, with individual baffles extending from 150 to 200 ft in length. A total of approximately 1400 linear ft of rock baffles will be installed; 675 linear ft on the east bank and 725 linear ft along the right side.

Construction

Prior to any construction activities within a given project reach, a qualified biologist shall survey for the presence of steelhead. If steelhead are present, a qualified biologist shall net and relocate them to suitable habitat within Mission Creek. Methods for steelhead capture and relocation are discussed below.

Construction activities shall begin at the downstream extent of the project area and progress upstream. Project construction is expected to last 3 years, although delays due to weather or mechanical failure could prolong the project for an additional 1 to 2 years. For construction within the estuary from Cabrillo Boulevard up to Yanonali Street, all construction within the creek will occur between June 1 and December 1 of any given year. Upstream of the estuary work could begin as early as April 15, but only if Mission Creek does **not** have continuous surface flow between Oak Park and the upper extent of the project area. If surface flow persists, construction will only occur after June 1. Only one side of the channel will be isolated and dewatered at any given time to allow normal tidal flushing and unimpeded stream flows within the other half.

In order to dewater the work area within the estuary, a temporary barrier will be installed down the centerline of the proposed channel (not the existing centerline) by driving sheet piles. Pile driving equipment working from the top of the eastern bank will drive the sheet piles near the existing east bank. Barriers will then be installed at the upper and then the lower end of the proposed centerline to create an enclosure on one side (on the east side first) of the creek. The enclosure will be seined by qualified biologists to remove any fish trapped within the area. Once all fish are removed, pumps fitted with ½ inch mesh screens will be used to pump water out of the enclosure. Biologists will continue to monitor the enclosure while water is pumped out in order to rescue any fish that were missed during the initial seining. Construction activities, including excavation and wall construction will then be completed within the dewatered area. The ACOE will complete construction along one side of the estuary, between Cabrillo Boulevard and Yanonali Street, in a single segment, thus avoiding the complications of repetitive de-watering processes in multiple short segments of the estuary. Once construction is completed within the dewatered work area, the downstream and upstream barriers will be removed and installed on the opposite side of the channel. The new enclosure will be surveyed and dewatered as described above, and construction within the newly dewatered area will be completed.

Prior to construction upstream of the estuary stream flow will be diverted through 2 culverts set into a temporary pilot channel that will be dug into the channel invert. The combined capacity of the two culverts will be at least 40 cfs. Culverts will be smooth along their inner walls and at transitions between segments. Following construction, the streambed will be shaped according to design elevation and slope. A lowflow channel will be constructed through the project area and the channel invert will be restored using substrate representative of natural conditions (type and size) in lower Mission Creek. Following restoration of the channel invert, the diversion will be removed. This sequence of activities will continue upstream until the project is finished.

Revegetation

Of the 7310 linear feet of stream bank within the project area (excluding bridges and the 940 ft length of the oxbow) , 2100 linear feet (29%) have natural soft surfaces, while the remaining 5210 linear feet (71%) have some form of revetment. Vegetation grows along all of the embankments with soft surfaces and through cracks within the hard surfaces. The vegetation present is dominated by invasive non-native species, such as giant reed (*Arundo donax*). As much as is practicable, large native trees that are present will be avoided and saved. When finished, the combination toe-wall and riprap slope would occupy 4740 linear feet (65%) while full-height vertical walls would remain along 2510 linear feet (35%) of the stabilized banks. Following construction the riprap sideslopes and habitat expansion areas will be replanted with native vegetation. A minimum of 120 trees will be planted on the sideslopes and a minimum of 330

trees will be planted in the habitat expansion areas. Exact tree species have not been determined but will include western sycamore, Fremont's cottonwood, black cottonwood, coast live oak, white alder, California bay, Arroyo willow, wax myrtle, Mexican elderberry, squaw bush, and blackberry. In addition, sideslopes and habitat expansion areas will be revegetated with native shrubs and grasses by hydroseeding. A temporary, above ground irrigation system will be installed to irrigate planted vegetation for at least 3 years. Any dead or dying trees and shrubs shall be replaced immediately (except during midsummer). Non-native vegetation will be controlled, by brushing or herbicide, and/or removed.

In order to insure success of revegetation efforts, the ACOE has developed a detailed vegetation monitoring plan. Riparian corridors will be monitored every 3 months during the first year following construction, every 4 months during the second year, and every 6 months during the third, fourth and fifth year. Following the fifth year, the County will incorporate all monitoring and maintenance activities into their annual streambed maintenance activities. Growth rates of trees and shrubs will be documented for 5 years. If plants do not meet pre-determined growth rates, growing conditions will be improved using fertilization or increased irrigation. Success of revegetation will be defined by the following:

1. A minimum of 90% survival of planted vegetation after five years.
2. A minimum of 40% survival of shrubs after five years. All shrubs should attain at least 50% the height and breadth typical of each in this climate.
3. A minimum of 50% of the riparian corridor should be occupied by willows, 7 to 10 ft in height, after five years.

Maintenance

The County will be responsible for maintaining the project reach at its design function and form. All maintenance activities will be accomplished between August 1 and October 31 of any given year. Maintenance activities could include sediment and vegetation removal, repair of concrete walls, culvert, riprap, side baffles, and boulder fields, and upkeep of the riparian corridor. All maintenance activities will be documented in the County's Annual Maintenance Plan.

Sediment and vegetation will be cleared in any areas where the design capacity of the creek is lowered by 15% or more. Prior to any maintenance activities a qualified biologist will survey project areas and relocate any steelhead found there to suitable habitat within Mission Creek. Methods for steelhead capture and relocation are discussed below. Sediment will be removed using a loader or road grader working from within the channel. Vegetation will be removed by brushing, clearing, or spraying. Removal will be completed in a mosaic pattern so that only one side of the creek shall be cleared during any given year. To achieve the mosaic pattern, a swath, half the width of the channel, will be cleared along one side of the creek for a distance of approximately 100-200 ft. Activities within the 100-200 ft downstream of this swath will then be confined to the

opposite half of the creek. This pattern will continue downstream until maintenance activities are completed. The areas of the creek that are not excavated or cleared would be mowed to suppress woody vegetation, while allowing herbaceous vegetation to grow.

Following any clearing activities, a low flow channel will be constructed or re-established so that streamflow passes close to areas where cover and shading are available throughout the dry season. Removal of sediment and/or mowing of vegetation would likely occur once every 3 years, depending on climatic conditions. However, a sequence of large storm could necessitate maintenance activities to be performed as often as once a year. Areas of clearing will be reversed between years so that no one area is excavated or completely cleared two years in a row unless necessary to remove sediments deposited by unexpectedly large storm events in order to restore design capacity.

Sediment will also be removed from among boulder clusters and side baffles as needed to prevent them from being buried. Any woody vegetation, such as giant reed or salt cedar, will be removed from within the boulder clusters using hand tools or herbicides. Low growing herbaceous plants will be left in place.

Concrete structures, such as vertical walls, bridge abutments, ledges or culverts, will be inspected annually for cracking, chipping, breaking, sedimentation, uplift or scour. Repair of these structures will occur as needed. If dewatering is necessary to complete repairs, methods described above will be utilized. Any boulders that are displaced by currents will be pushed back into a suitable spot and reset. The County will also inspect and repair vegetated side slopes to maintain the riparian corridor. Riprap and topsoil will be replaced as necessary.

Fish Relocations

Fish relocations will be done in conjunction with, or at the direction of NMFS and/or California Department of Fish & Game (CDFG) using approved techniques. Steelhead will be caught with nets and moved to suitable habitat within Mission Creek and its major tributaries only; no fish will be relocated outside of the creek system. Specific relocation sites will be determined in conjunction with NMFS and CDFG prior to any relocation activities. Relocation will be conducted in a manner that mimics their natural migration patterns. Juvenile fish that appear to be smolting will be moved downstream to suitable habitat while juveniles that appear to be over-summering will be moved upstream to suitable habitat.

Once caught, fish shall be immediately placed in a 5-gallon bucket or 45-gallon ice chest filled with water from the immediate area. Oxygen will be diffused into the container while fish are present. Fish will be immediately transported to the relocation sites and released. Once fish are released, the biologist shall observe the relocated fish, document their behavior for at least one hour, and then return

the following day to make additional observations of the fish presence and behavior.

Upon completion, a report shall be submitted to NMFS documenting all relocation efforts. The report shall include the following information: 1) location of the fish prior to relocation, 2) number of fish relocated, 3) estimated size of fish relocated, 4) general observations of fish condition, 5) time fish was netted, 6) time for transport, 7) relocation site, 8) time of release, and 9) observations made after relocation.

Monitoring

The ACOE shall develop a monitoring plan, to be approved by NMFS, to ensure that flow conditions within the flood control channel match those predicted during pre-project analyses. The plan will include measures to monitor continuous flow conditions and benchmark water depths and velocities. Monitoring will also include observations of how the rock baffles are interacting with the lowflow channel and any opportunistic observations of steelhead migration. If data collected during monitoring indicate that conditions are not suitable for upstream steelhead migration, the ACOE will modify the channel to provide passage.

III. STATUS OF THE SPECIES

INTRODUCTION

Based on the location, timing, and operations of the proposed project, endangered steelhead and designated steelhead critical habitat could be adversely affected by project activities. Adverse impacts could occur due to stream diversion, channel and embankment excavation, vertical wall construction within the creek channel and riparian corridor, and future maintenance of the flood control channel within Mission Creek.

STATUS

Steelhead, the ocean-going form of rainbow trout, are native to Pacific Coast streams from Alaska south to northwestern Mexico (Moyle 1976; National Marine Fisheries Service 1997). Wild steelhead populations in California have decreased from their historic levels (Swift et al. 1993; National Marine Fisheries Service 1997). This decline prompted listing of the Southern California ESU of steelhead as endangered on August 18, 1997 (National Marine Fisheries Service 1997).

The relationship between resident rainbow trout and steelhead trout in most areas is complicated and poorly understood. Although often separated by a natural or man-made barrier to migration, the two forms can interbreed. In addition, resident trout can produce anadromous offspring and vice versa

(National Marine Fisheries Service 1996; Shapovalov and Taft 1954). Anadromous individuals also are capable of residualizing when access to the ocean is blocked, and then returning to anadromy when access is restored. The listing for the Southern California ESU includes all naturally spawned populations of steelhead and their progeny residing below long-term barriers (National Marine Fisheries Service 1997). Adults that have migrated to the ocean usually are larger and more silvery than adult resident trout due to changes in diet and physiological characteristics necessary for ocean survival (Shapovalov and Taft 1954). It is difficult, however, to distinguish juvenile rainbow trout from juvenile steelhead trout without genetic analyses.

The Southern California ESU extends from the Santa Maria River in Santa Barbara County to Malibu Creek in Los Angeles County (inclusive). In the Southern California ESU, there are four major rivers: Malibu Creek and the Santa Clara, Santa Ynez, and Ventura Rivers, and numerous creek drainages that provide important habitat for steelhead. Historically, steelhead probably utilized many coastal streams and rivers in Southern California. For example, historical records document steelhead utilization of the Santa Maria and Santa Ynez Rivers and their major tributaries, and Gaviota, Arroyo Hondo, Venadito, Las Flores Canyon, El Capitan, Corral, Refugio, Atascadero, Mission, Montecito, Carpinteria, and Rincon Creeks (Henke 1998; Swift et al. 1993, Titus et al. in press) the Ventura River, Santa Clara River, Big Sycamore Canyon Creek, Malibu Creek and Topanga Canyon Creek (Busby et al. 1996; Swift et al. 1993).

General causes for the decline of steelhead abundance throughout Southern California include destruction and modification of habitat, point and non-point source water pollution, water withdrawals and diversions, dam operation and maintenance, over-utilization of habitat for recreational purposes, recreational harvest, and natural factors (National Marine Fisheries Service 1997). Even in less urbanized areas, agricultural land-use has led to decreased water quality, reduced vegetation and increased erosion and sedimentation.

In addition, access to many waterways, including critical spawning and rearing habitat, is constrained by manmade barriers (e.g., dams, culverts, road crossing structures, flood control structures, and channelization) and seasonal fluctuations in hydrological conditions. Complete barriers block the use of the upper watershed, often the most productive spawning and rearing habitat in the system. Temporal barriers block passage during certain flow conditions and delay migration. Salmonids generally expend 80% of their stored energy during normal upstream migration to spawning areas (Lauman 1976). Any additional delays can force these fish to use up limited energy reserves, which can significantly impair spawning success. Partial barriers block smaller or weaker fish of a population, limiting the number of fish able to reach spawning grounds. Thus, man-made structures that act as barriers to steelhead passage can have significant impacts on production.

Estimates of run sizes for the major rivers in the Southern California ESU are as follows: Santa Ynez River, <100; Ventura River, <200; Santa Clara River, <100; Malibu Creek, <100 (Busby et al. 1996). These run estimates are not based on survey data and cannot be used to quantitatively assess population abundance throughout the entire Southern California ESU. Although abundance estimates are limited, surveys document the continued existence of steelhead within the Santa Ynez River and some of its tributaries (Busby et al. 1996), Arroyo Hondo Creek (Busby et al. 1996), Gaviota Creek (Reavis 1991; Virginia Gardner, CA State Parks Dept., pers. comm., 1998), Maria Ygnacio Creek (M. Cardenas, CDFG, pers. comm., 1999), Mission Creek (CDFG 1996), Montecito Creek (K. Johnson, NMFS, pers. obs., 1999), San Ysidro Creek (K. Johnson, NMFS, pers. obs., 1999), Carpenteria Creek (CDFG 1996), Ventura River (Reavis 1991), Santa Clara River (Reavis 1991; Nehlsen et al. 1991; CDFG 1996), and Malibu Creek (Reavis 1991; Nehlsen et al. 1991). Information from these surveys indicate, however, that Southern California steelhead numbers are very low and that the population is in danger of extinction.

Life History and Habitat Requirements

The major life history stages of steelhead involve freshwater rearing and emigration of juveniles, upstream migration of adults, spawning, and incubation of embryos (Shapovalov and Taft 1954; Moyle 1976; Cederholm and Martin 1983; Barnhart 1991; Meehan and Bjornn 1991; Busby et al. 1996; National Marine Fisheries Service 1997). Steelhead young rear in freshwater for one to three years before migrating to the ocean, usually in the spring, where they may remain for up to four years. Steelhead grow and reach maturity at age two to four while in the ocean. The majority of adults immigrate to natal streams for spawning, however some individuals stray to streams other than their natal one (Quinn 1993). This straying serves as one mechanism for dispersal and colonization of new or historical habitats or streams (Wood 1995). Most adults immigrate to freshwater during October to March. Adults may migrate several miles, hundreds of miles in some watersheds, to reach their spawning grounds. Although spawning may occur during December to June, the specific timing of spawning may vary a month or more among streams within a region. Steelhead do not necessarily die after spawning and may return to the ocean, sometimes repeating their spawning migration one or more years.

When spawning, female steelhead dig a nest in the stream and then deposit their eggs. After fertilization by the male, the female covers the nest with a layer of gravel; the eggs incubate within the gravel pocket. Hatching time varies from about three weeks to two months depending on water temperature. The young fish emerge from the nest about two to six weeks after hatching.

Habitat requirements of steelhead in streams generally depend on the life history stage (Cederholm and Martin 1983; Bjornn and Reiser 1991). Streamflow volume, water temperature, and water chemistry must be appropriate for adult

immigration and juvenile emigration (specific habitat requirement data can be found in Bjornn and Reiser 1991). Low streamflow, high water temperature, physical barriers, low dissolved oxygen, and high turbidity can delay or halt upstream migration of adults and timing of spawning, and downstream migration of juveniles and subsequent entry into estuary, lagoon, or ocean habitats. Suitable water depth and velocity, and substrate composition are the primary requirements for spawning, but water temperature and turbidity are also important. Dissolved oxygen concentration, pH, and water temperature are factors affecting survival of incubating embryos. Fine sediment, sand and smaller particles can fill interstitial spaces between substrate particles, thereby reducing water-flow through and dissolved oxygen levels within a nest. Juvenile steelhead require living space (different combinations of water depth and velocity), shelter from predators and harsh environmental conditions, food resources, and suitable water quality and quantity, for ontogeny and survival during summer and winter. Young-of-the-year and yearling steelhead generally use riffles and runs (e.g., Roper et al. 1994) during much of a given year where these habitats exist. Young-of-the-year and older juveniles may seek cover and cool water in pools during the summer (Nielsen et al. 1994).

The information used to describe steelhead life history is largely based on northern populations. Specific data on the life history of southern steelhead are lacking and northern populations provide a general description of steelhead life history and habitat requirements. There are some differences between the two populations. For example, annual rainfall and stream flow is considerably lower and more variable in Southern California than in regions to the north (Moore 1980; Titus et al. in press). Southern California steelhead are often subject to higher water temperatures, increased duration of sand berms across the mouths of streams and rivers, and complete dewatering of some reaches of these streams. These factors influence the migration and life history of Southern California steelhead, and could result in differences between the life history of southern and northern populations. At this time, however, data to support or describe these differences is unavailable. Therefore, NMFS will consider the life history aspects of northern and southern populations comparable for the purpose of this biological opinion.

CRITICAL HABITAT

Critical habitat for the Southern California Evolutionarily Significant Unit for the Federally endangered steelhead, published on February 16, 2000 (50 CFR 226; NMFS 2000), includes all freshwater and estuarine areas, including adjacent riparian zones, accessible to listed steelhead in coastal river basins from the Santa Maria River to Malibu Creek (inclusive). Freshwater critical habitat includes all waterways and substrates below longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). Essential features of steelhead critical habitat include adequate substrate, water quality, water temperature, water velocity, cover/shelter, flood, riparian

vegetation, space, and safe passage conditions. Excluded from designated critical habitat are former anadromous areas above the following dams: Vaquero Dam on the Cuyama River; Bradbury Dam on the Santa Ynez River; Casitas Dam and Robles Diversion on the Ventura River; Santa Felicia Dam on Santa Clara River; and Rindge Dam on Santa Monica Bay.

IV. Environmental Baseline

Watershed Overview

Mission Creek flows from the south side of the Santa Ynez Mountains through the City of Santa Barbara where it meets the Pacific Ocean. The creek and its main tributary, Rattlesnake Creek, drain approximately 11.4 square miles. Average gradients in the foothill area are about 1000 ft per mile in contrast to the gradients of 150 ft per mile in the lower reaches of the creek. Other than informal surveys, comprehensive data on steelhead abundance in Mission Creek are unavailable.

Mission Creek can be divided into two sections: the upper watershed within the Santa Ynez Mountains and foothills, and the lower section beginning at the foothills and extending down through downtown Santa Barbara to the ocean. A reasonable location marking the transition between these two areas is the Santa Barbara Mission located 4 miles upstream from the Pacific Ocean. Upper Mission Creek consists of mostly natural habitat with extensive riffle-pool complexes and healthy, developed riparian vegetation dominated by western sycamore, cottonwood, coast live oak, and willow trees. This area of the Mission Creek watershed contains the majority of suitable steelhead spawning and rearing habitat within the system. Although no systematic surveys have been completed, trout have been observed repeatedly upstream from the Mission on both Mission and Rattlesnake Creeks. In June 1999, NMFS biologists walked portions of these areas and observed 4 to 5 trout near the Natural History Museum, 9 large and numerous small trout on Rattlesnake Creek, and tens to hundreds of 1 to 4 inch young-of-the-year (YOY) throughout lower Rattlesnake Creek. Two adults and several YOY were observed at a large scour pool at base of Foothill Bridge and Los Olivos Bridge. These two bridges have concrete aprons that could act as partial impediments to steelhead migration. Trout were observed again in the above areas in July 2000.

Barriers on both Mission and Rattlesnake Creeks block steelhead passage to the highest extent of the watershed. The Botanical Gardens on Mission Creek, located approximately 1 mile upstream of the confluence with Rattlesnake Creek, has an historical dam with aquaduct that stands over 15-20 ft tall. This structure is a complete barrier to steelhead upstream migration. Approximately 2000 ft upstream of this dam is a County owned debris basin that was built in 1964 following the Coyote Fire. This debris basin has a dam associated with it that is a total barrier to steelhead migration. On Rattlesnake Creek, approximately 1.6

miles upstream with the confluence with Mission Creek, there is another debris basin that was also built in 1964 after the Coyote Fire. Again, this basin has an associated dam that impedes migration of steelhead. CDFG biologists have observed trout upstream of these barriers. It is possible that these trout are descendants of residualized steelhead that would demonstrate anadromy if access to the ocean were restored. It is also possible that these trout, whether descendants of resident or steelhead trout, are producing anadromous offspring that are either residualizing above the barriers, or successfully migrating downstream through the various barriers during optimal flow regimes.

Natural habitat persists into lower Mission Creek, but this reach is highly confined due to residential and commercial development. Two reaches within this area have been lined with concrete: a 0.3 mile section and 0.8 mile section both built by the California Department of Transportation in conjunction with the Highway 101 Freeway. Under high flow conditions, velocities increase within these channels and can result in passage impediments. At low flow conditions, streamflow spreads out into a thin layer across the smooth, flat channel. These shallow depths can also act as impediments to steelhead migration. Although good habitat is more limited in lower Mission Creek, steelhead have been observed in some areas. In spring 2000, a CDFG biologist estimated approximately 100-200 trout (6-8 inches in length) in large pools in Oak Park, located approximately 2.6 miles upstream from the ocean.

Flow characteristics are highly variable in Mission Creek and are reflective of the variability in rainfall. Average total annual rainfall between October 1983 and May 2000 in Santa Barbara County is 19.94 inches. The majority of rainfall occurs in December, January, February and March, but is still unpredictable and sporadic between years. Within the above time period total monthly rainfall between December and March ranged from 0 to 20.86 inches per month. Because of the unpredictable timing and magnitude of rainfall, and thus streamflow, flow conditions that allow for steelhead migration can be limited. Suitable rearing habitat is also limited by streamflow in Mission Creek as large sections of lower Mission Creek go dry during summer and fall of most years. It is unknown whether the juveniles observed within and downstream of the project site are migratory steelhead or resident trout, but because they were found in a coastal stream with downstream access to the ocean, they are assumed to be steelhead by NMFS.

Factors Affecting Species in Action Area

The action area begins just downstream of the longer Caltrans channel at Canon Perdido Street. Within the action area, Mission Creek parallels Highway 101 and then turns to the west in an area known as the oxbow. This section of Mission Creek has been altered extensively by manmade structures. Starting at the oxbow, Mission Creek flows through a 140 ft long box culvert (Highway 101), a 60 ft section lined by riprap and wing walls, a 60 ft wide box culvert (Montecito

Street), a 20 ft section lined with wing walls, a 70 ft section beneath the Union Pacific Railroad tracks and then through a 530 ft section lined with historic sandstone. A 15 inch high sill exists at the downstream end of the sandstone lining (Yanonali Street). This location marks the change from freshwater to brackish water at the upstream extent of the estuary.

In addition, many short reaches of lower Mission Creek are lined with various bank stabilization treatments installed by the City and/or private landowners. Typical treatments include piled stone, sacked concrete, gabions, vertical cement walls, and pipe and wire revetment. These treatments cover approximately 5240 linear ft of embankments (including both banks) and have reduced habitat for fish and wildlife and caused the loss of riparian vegetation. Vegetation that has persisted is highly disturbed with extensive growth of non-natives. The majority of vegetation along embankments is influenced by residential and commercial landscaping.

The County routinely clears sediments and vegetation that accumulate within lower Mission Creek to maintain flood capacity. Vegetation that grows within the channel is mowed and sprayed with herbicides by the County to maintain flood capacity of the channel. Accumulated silts are cleared using loaders. Following flood control maintenance, the channel is often a flat, trapezoidal channel devoid of heterogeneity.

The downstream extent of Mission Creek, extending approximately 1060 linear ft upstream from the mouth of the creek, is tidally influenced. The estuary flows under State Street in the City of Santa Barbara and empties in the Pacific Ocean near Stearn's Wharf and the Santa Barbara Marina. The wharf and beach in this area are used heavily for recreational activities. In the past, the City of Santa Barbara has relocated the mouth entrance to avoid the debris washing into the Marina. The City also artificially breaches the mouth of Mission Creek during summer months to avoid stagnant water, which can be unsightly or have an unpleasant odor, in an area of high tourist use.

STATUS OF SPECIES IN ACTION AREA

There are anecdotal observations of juvenile trout in scour pools in lower Mission Creek. Most of the pools that persist during summer months are located in the lower portion of the project area, and are formed due to scouring below and behind hard bank lining. It is likely that juveniles found in these pools have been washed or actively move downstream and are then unable to move back upstream to more suitable rearing habitat when flows decline rapidly in early summer.

In March 2000, a 27 inch female steelhead spawned within the project area, just downstream of De la Guerra Street. The female created four redds, two of which were fertilized by a smaller male steelhead. It is probable that the steelhead

moved into Mission Creek following a significant rainfall event in late February. And then, as is common for Mission Creek, flows dropped too quickly to provide sufficient water depth at the 0.8 mile Caltrans channel for the female to continue moving upstream to good spawning habitat. If this was the case, then the female was forced to spawn within the upstream reach of the project area, which did not provide optimal conditions for spawning. After spawning, the male migrated downstream, presumably to the ocean. The female did not survive, nor did any of the fertilized eggs.

On May 4, 2000, ACOE and US Fish and Wildlife Service staff observed 2 juvenile steelhead (6-8 inches in length) near the Mason Street Bridge in the Mission Creek estuary. These fish were probably smolts making their way to the ocean, and could have been some of the same fish seen by CDFG at Oak Park a month or so earlier. Thus, there exists the potential for juvenile steelhead to be present within and downstream of the project area during project activities. Furthermore, fish passage must be maintained through the project area for downstream migration of smolts and upstream movement of juveniles and adults.

V. Effects of Project Action

Introduction

Generally, possible effects of the project action on steelhead and their proposed critical habitat are those associated with construction and maintenance of the flood control channel, including excavation of the creek bed and embankments, installation and maintenance of vertical concrete walls and structures, continued excavation and removal of woody debris and vegetation as needed, and relocation and monitoring of steelhead. Anticipated effects involve possible take in the form of capture, trap, harm, harassment, injury, and/or mortality of juvenile steelhead present in the project area, loss and alteration of instream and riparian habitat, loss of aquatic macroinvertebrates, turbidity, and sedimentation. Direct and indirect effects are discussed below. No interrelated or interdependent effects are anticipated.

Methodology for Effects Analysis

Useful quantitative data for the affected area and project action are limited; the assessment of project action effects therefore focuses mostly on qualitative identification. This approach was based on a review of ecological literature concerning the effects of loss and alteration of instream and riparian habitat, turbidity, and sedimentation on steelhead in particular and stream fish populations in general. This information was then compared to the estimated amount of instream, riparian, and aquatic macroinvertebrate losses, estimated background turbidity levels in the creek and associated with the project action, and estimated rates of sedimentation.

EFFECTS TO POPULATION

Migration

Project activities will include extensive dewatering and excavation during three consecutive years. Construction time windows have been incorporated to avoid winter and spring months when upstream migration of adults is most prevalent. No construction within the estuary will occur prior to June 1 of any year. Upstream of the estuary, work could begin as early as April 15, but only if Mission Creek does **not** have continuous surface flow (or less than ½ inch water depth at Caltrans cement channel) between Oak Park and the upper extent of the project area. If surface flow persists, construction will only occur after June 1. Under these conditions, no upstream or downstream migration of adults through the action area is expected, and outmigration of smolts through the action area should be minimal.

Stream diversions and dewatering are designed to allow for steelhead movement through the project area. At any given time only one half of the estuary will be dewatered to allow natural flow and tidal movement within the other half of the estuary. Upstream of the estuary, all flows will be directed through smooth pipe culverts, which allow downstream migration of smolts. Thus, except for the period of time (3-4 days) when the diversion is being constructed or relocated, any juveniles or smolts will be able to move freely through the project area.

Temporary delay in movement could occur for smolts when diversion culverts are being constructed. This artificial delay would only occur if continuous surface water were present. Because ACOE is required to begin construction only after June 1 if surface water is continuous, it is expected that the majority of outmigrating smolts should have moved down through the project area prior to start of project activities. Those individuals still migrating through, however, would be delayed for a period of up to 4 days while the culvert is being constructed. A biologist will be present during all diversion activities to relocate any fish, as necessary, that are delayed while the diversion culverts are put in place.

As described above, a number of possible impediments exist within Mission Creek, which steelhead must traverse to reach upstream spawning and rearing habitat. Under baseline conditions, steelhead must successfully pass through the channelized oxbow portion of the project area, through two Caltrans cement channels, and over numerous small vertical drops formed at bridge crossings. Because of these passage impediments, steelhead in Mission Creek are forced to use energy reserves above and beyond natural demands to reach good spawning habitat. Thus, any additional challenges placed on steelhead could severely delay or decrease successful migration, which in turn could lead to decreases in spawning output. To avoid additional impacts to steelhead

migration, the ACOE will provide suitable conditions, including water depths and velocities, for fish passage through the project area both during and following project construction.

ACOE has completed hydraulic modeling for the project area to analyze existing and post-project streamflow conditions. Table 2 contains pre- and post-project water velocities at representative cross sections throughout the project area. Models incorporate a water conveyance of 640 cfs, which is the estimated mean annual flow or 2.3-year flow event. Based on channel size, this is the upper flow limit for upstream fish migration. By completing analyses at this level, the ACOE is characterizing the highest velocities that steelhead would encounter.

Table 2. Existing and post-project water velocities (ft/sec) modeled at specific cross sections within the project area.

	Water velocity (ft/sec) when conveying 640 cfs		
Cross section	**Existing channel**	**Proposed channel**	**Difference**
11	5	7	2
10	8	6	-2
9	5	3	-2
8	10	5	-5
7	6	4	-2
6	9	4	-5
4	2	4	2
		Average Change	**-2**

Based on this modeling, streamflow velocities will decrease by approximately 1 to 6 fps at five locations and increase by approximately 2 fps at two locations, with an overall net decrease in water velocity over the entire project reach. Resulting velocities range from 3.89 to 6.88 feet per second (fps).

Bell (1990) reports sustained swimming speeds (normal functions without fatigue) for average sized adult steelhead at 0-4.6 feet per second (fps), prolonged swimming speeds (lasting 15 seconds to 200 minutes which result in fatigue) at 4.6-13.7 fps, and burst speeds (activities which cause fatigue in 15 seconds or less) ranging from 13.7-26.5 fps. Data used in the Bell (1973) study are based on steelhead in the Pacific Northwest, which typically are larger, and thus stronger, than Southern California steelhead. Therefore, Southern California steelhead swimming abilities probably lie in the lower or middle range of the above estimates. All of the above water velocities fall within the lower range of estimated prolonged swimming speeds for steelhead. In addition, side baffles will be placed throughout the project area to provide resting areas for migrating steelhead (every 100-200 linear feet between Canon Perdido and Bath Street, every 400-500 ft between Bath and Gutierrez Streets, and every 100-200 feet downstream of Gutierrez). Provided these features occur within the lowflow or wetted channel, steelhead should be able to break the project area into several shorter stretches, rather than traversing the entire channel in one continuous effort. Considering the minor (1.5%) slope, projected velocities and location of rock baffles throughout the project area, NMFS anticipates that the

ACOE flood control channel will provide suitable conditions for upstream migration of adult steelhead.

Ledges, baffles and boulder clusters installed by ACOE will not be of any use to steelhead if they are not contained in the thalwag of the channel. It is possible that natural flow events will establish a lowflow channel that flows away from these structures. It is impossible to determine whether or not this will occur, but in conversations the ACOE has been made aware of this possibility, and has agreed to modify placement of side baffles and boulders, to the maximum extent possible, in order to maximize the benefits realized by steelhead.

As a result of construction activities, the channel invert will be artificially flattened and widened and will lack any natural heterogeneity that is currently present. Under such conditions, fewer resting areas are available, flows are spread out across the channel rather than being concentrated in a lowflow channel, and fewer hard structures are present to break up velocities. Thus, upstream migration of adults is made more difficult. If left alone, the channel will take at least 1 to 2 years to recover to somewhat natural conditions. Furthermore, it is likely that the benefits proposed by the ledges and side baffles will take time to develop since large flows are required to scour out pools under the ledges. ACOE will minimize these impacts by insuring that substrates, representative of natural conditions, are present in the channel following construction and by constructing a lowflow channel that, as close as possible, matches what would be established naturally. Although ACOE will attempt to minimize these temporary effects, some are unavoidable and will increase the amount of effort required of steelhead during upstream migration. NMFS does not, however, anticipate that these impacts will cause a decline in the steelhead population in Mission Creek.

Relocation

Incidental mortality could occur as a result of handling if fish relocations become necessary. All work areas will be surveyed for steelhead prior to any construction or maintenance activities. Any fish found in work areas will be relocated to suitable habitat within Mission Creek. Fish will be caught with nets only; electrofishing will not be utilized. Based on previous experience of NMFS personnel, incidental mortality is expected to occur for only a small percentage (<10%) of the fish that are relocated. Areas in upper Mission Creek, where juveniles would be relocated to, have better habitat (including cover, water quality and temperature) for juveniles to survive and grow through the dry season. Therefore, juveniles that survive relocations will likely have an increased chance of survival than if forced, even under natural conditions, to remain in poor habitat in lower Mission Creek. Given the conditions anticipated during project construction, these fish would certainly die if not relocated out of the construction area.

The number of fish that will need to be relocated, if any, is unknown at this time, but, as mentioned above, should be limited to rearing juveniles and outmigrating smolts. During most years, Mission Creek goes dry between Oak Park and the project area. Any rearing juveniles downstream of the cement channel are limited to the estuary and a limited number of scour pools for oversummering habitat. No records are available on the number of juveniles rearing in lower Mission Creek, but numbers are expected to be low, based on limited pool availability and poor habitat conditions. If we assume that 10 to 20 juveniles (which is likely an overestimate) will have to be relocated, and that 10% will die because of handling, then approximately 1 to 2 juveniles per year would be harmed or killed during relocations.

Observations of juveniles in the project area are isolated and sparse. Casual surveys by NMFS staff in upper Mission and Rattlesnake Creeks document high juvenile abundances (100s) during early summer months over at least 2-3 consecutive years. This information indicates that the upper Mission Creek watershed provides the vast majority, if not all, suitable spawning and rearing habitat for the system. The few juveniles seen rearing in the lower watershed (anecdotal observations) are most likely a small fraction of the juveniles present throughout the entire system.

Estimates of numbers of smolts migrating downstream through the project area also are not available. However, as described above, CDFG personnel observed approximately 100-200 fish (6-8 inches in length) in large pools at Oak Park during March 2000. A few weeks after the time of observation, 2 individuals of the same approximate size were observed in the estuary near the Mason Street Bridge. It is probable that the fish seen in the estuary were some of the same seen at Oak Park, on their way out to the Ocean. If a similar pattern of outmigration occurs during ACOE project activities, smolts may need relocating. Relocation will only be necessary, however, if they are present while diversions are constructed. Once diversions are in place, smolts will be able to move freely through the project area and will not need relocating. As discussed above, the majority of outmigration by smolts is expected to occur prior to the start of project construction. Continuous surface water persists into June only during years with relatively high rainfall. Even if these conditions occur, diversions will require only 1 to 4 days for construction. Because of the timing of diversion activities and limited time period for possible impacts, only a small number of smolts are expected to be present in the project area. NMFS anticipates that no more than 10 smolts, per year, will need relocation. Assuming 10% mortality due to handling, 1 individual smolt will be harmed or killed due to project construction activities.

ALTERATION OF INSTREAM HABITAT

Instream habitat is designated critical habitat within the Southern California ESU for the Federally endangered steelhead. Direct loss or alteration of instream habitat results when creek habitat is removed or modified during construction activities. The extent that steelhead are indirectly harmed by instream habitat alterations depends, in part, on the extent of permanent changes to substrate type, cover complexity, instream habitat complexity, water column depth and velocity patterns. Modifications that degrade the quality of instream habitat may cause reductions in fish abundance (Elser 1968; Hunt 1969; Dolloff 1986; Riley and Fausch 1995).

Project construction will impact, through excavation, grading and shaping approximately 5380 linear ft of instream habitat in Mission Creek (Table 3). Current instream habitat within the proposed project area consists of cement channel, and natural run habitat with a few isolated pools. Portions of this habitat will be unavailable to steelhead during construction. The ACOE flood control project will remove 420 linear ft of the existing cement channel and will leave any existing natural bottom in place. As discussed above, temporary impacts resulting from construction activities are unavoidable. Because of the extensive excavation and grading, the natural bottom will require time to recover and develop heterogeneous features. Under existing conditions, lower Mission Creek provides only limited habitat for oversummering juveniles. Suitable spawning habitat is not present. Because steelhead use the area primarily as a migration corridor, current use of this area will not be altered.

Table 3. Summary of linear feet altered by ACOE construction activities.

Feature	Existing Amount (ft)	Proposed Amount (ft)	Difference (ft)
Hard Channel Lining	1350	930	- 420
Hard Bank Protection	5210	6885	+ 1675

Maintenance of the flood control channel by the County will result in continued impacts to the channel invert of lower Mission Creek. Channel clearing and excavation will be completed any time capacity within a reach is lowered by at least 15%. The County will conduct maintenance activities in a mosaic pattern, as described above [See Project Description section], so that the same area is not impacted during consecutive years. Maintenance activities proposed by the County are the same as those that the County has been implementing for several years. ACOE completed a sediment deposition analysis for the project area, which can be used to determine if construction of the flood control channel will result in more frequent or more extensive maintenance than existing conditions require. Results of the analyses indicate that project construction will result in a net increase of 25 cubic yards of sediment after a 1-year storm event, and net decreases of 35 cubic yards and 385 cubic yards for 5-year and 20-year events, respectively. Thus, recurrent maintenance within the upstream channel and

estuary should be less extensive than current practices until the occurrence of a large storm event (over 20 years).

Although the channel invert will be left to somewhat natural conditions, both embankments along the entire project reach will be lined with vertical cement walls of varying height (Table 3). Considering existing hard bank structures resulting from previous bank stabilization projects, the ACOE flood control channel will result in a loss of approximately 1675 linear feet of natural embankment. Vertical walls that would replace natural embankments do not allow for undercut banks or scour pools that provide important habitat and cover for steelhead. To compensate for the loss of natural embankment, ACOE has incorporated 1190 linear ft of overhanging ledges and 1940 linear ft of rock side baffles to promote formation of scour pools and provide shade and cover. Provided ledges and baffles provide the benefits to steelhead as currently proposed, these features should compensate somewhat for the loss of natural banks.

The additional benefits of natural bank, however, such as woody debris, leaf litter and insect drop, can not be simulated with manmade structures. These features provide important cover and food resources for rearing juveniles. The loss of this input in the project area will further preclude restoration of lower Mission Creek to include suitable rearing habitat. However, the current use of lower Mission Creek as a migration corridor will not be impacted.

Loss of Riparian Habitat

The riparian habitat affected by the project is part of designated critical habitat for the Southern California ESU for the Federally endangered steelhead. The functional values of riparian corridors and the benefits they provide to aquatic systems in general, and stream fish populations in particular, are well documented (Hall and Lantz 1969; Karr and Schlosser 1978; Lowrance et al. 1985; Wesche et al. 1987; Gregory et al. 1991; Platts 1991; Welsch 1991; Castelle et al. 1994; Lowrance et al. 1995; Wang et al. 1997).

Excavation activities will result in a loss of riparian vegetation along 7310 linear feet of embankment. Loss of riparian trees might increase the extent of solar radiation and fine sediment input to the creek, increase stream temperatures, reduce insect drop, and decrease the amount of woody debris input to streams. As much as is practicable, large sycamores will be avoided. As part of project activities, the ACOE has incorporated an extensive re-vegetation plan to mitigate for loss of existing trees and vegetation and to establish a healthy riparian corridor. The majority of vegetation that will be impacted consists of non-native vegetation, such as giant reed. These non-natives will be replaced with native vegetation and, ultimately, will improve the qualities of the riparian corridor. Riparian vegetation that provides shade, cover and insect drop for steelhead, however, will take a number of years to develop.

A shading analysis (Sierra Land Designer – 3D) was conducted to estimate the amount of Mission Creek that will be shaded following revegetation. The analysis concludes that upstream of Highway 101, Mission Creek will be completely shaded in 5 to 10 years. Fast growing willows and shrubs should provide some shading within the first 1 to 2 years. Under existing conditions downstream of Highway 101, the majority of shading is provided by buildings and houses, non-native giant reed, and some large sycamores. The sycamores will be left in place, as much as is practicable. Loss of giant reed will lessen shading in the short term, but replacement with sycamores and willows will eventually provide increased cover and shading within a few years. Phased construction over the course of 3 years insures that the entire reach will not be completely devoid of shading or vegetation at any given time. Although loss of natural cover and shading will occur temporarily following construction, shading and cover should begin to recover after 1 to 2 years.

Vegetation within the channel invert will be limited in size and nature during the County's routine maintenance activities. Vegetation greater than 4 inches in diameter will not be allowed to grow within the channel invert. These maintenance activities are currently conducted routinely throughout Santa Barbara County, including lower Mission Creek. Vegetation clearing is not expected to alter steelhead use of the project area, especially with shading and cover expected from the vegetated sideslopes and wall ledges.

SEDIMENTATION AND TURBIDITY

Turbidity refers to the amount of light that is scattered or absorbed by a fluid. Elevated levels of turbidity may result when fine sediment is contributed to the creek during project activities. High turbidity concentrations can cause fish mortality, reduce fish feeding efficiency, and decrease food availability (Berg and Northcote 1985; McLeay et al. 1987; Gregory and Northcote 1993; Velagic 1995). Turbidity may cause indirect harm, injury, or mortality to juvenile steelhead in the vicinity and downstream of the worksites due to decreases in respiratory function, feeding and/or growth (Waters 1995). Sedimentation occurs when fine sediments, such as those suspended during project activities, settle out of the water column and onto the creek substrate. Substantial sedimentation rates could bury less mobile organisms that serve as a food source for many fish species (Ellis 1936; Cordone and Kelley 1961), degrade instream habitat conditions (Cordone and Kelley 1961; Eaglin and Hubert 1993), cause reductions in fish abundance (Alexander and Hansen 1986; Berkman and Rabeni 1987), and reduce growth in salmonids (Crouse et al. 1991).

Channel excavation and grading could result in an increase of fine sediments within the creek channel. This would cause increased turbidity and sedimentation if these sediments are suspended and washed downstream during the following winter storm events. Because embankments will be armored with

vertical cement walls, sediment input will be limited to the channel invert and erosion of topsoil placed on top of riprap sideslopes. In order to minimize inputs of sediments into Mission Creek, ACOE will use pipe culverts to divert streamflow around project areas during excavation, grading and revegetation. In addition, any bare soil along the sideslopes will be covered with landscaping mat until vegetation has established enough to stabilize the soil.

As water levels drop during summer months, exposure to sun and wind causes sediment to loosen and dry. Thus, high turbidity and sedimentation occurs naturally during early winter storm events when unconsolidated sediments are suspended and washed downstream. Unconsolidated sediments resulting from project activities are expected to be washed downstream during the first rain event of each year when background levels are high. Although these background levels will be increased due to project activities, the increase will be limited to sections within the lower 1.2 miles of the creek and are expected to be temporary. Steelhead could be temporarily delayed if turbidity levels are too high to allow migration. NMFS expects, however, that the degree of increase will not increase significantly over background levels to delay migration.

VI. Cumulative Effects

Cumulative effects include the effects of future state, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. The NMFS is generally familiar with actions affecting steelhead in Mission Creek and is unaware of such actions that would be reasonably certain to occur within the action area. Future Federal actions that are unrelated to the project action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Consequently, NMFS believes no cumulative effects are likely.

VI. Summary

Steelhead occurring within the project area during construction will be limited mainly to rearing juveniles and outmigrating smolts. Minor amounts of harassment and incidental mortality could occur (10-20 fish captured and 1-2 individuals experience mortality during relocations) during stream diversion and relocations. This small number of individuals affected is not expected to affect the survival of the steelhead population in Mission Creek or the survival and recovery of the Southern California ESU.

NMFS expects 5380 linear ft of temporary and permanent impacts to designated critical habitat, along the channel invert and both embankments, resulting from the project action. Within this area, project construction will result in the permanent loss of natural banks, and temporary degradation to the stream bed and riparian vegetation. In addition, maintenance activities will result in ongoing impacts to the stream bed. These impacts, however, will not alter the current use

of lower Mission Creek as a steelhead migration corridor. Furthermore, with the maintenance of a natural bottom channel bed, incorporation of fish baffles and ledges, and enhancement of the riparian corridor, including replacement of non-native with native vegetation, these impacts are not expected to diminish the value of habitat for the survival and recovery of the Mission Creek population or of the Southern California ESU.

VII. CONCLUSION

After reviewing the best scientific and commercial data available and the current status of steelhead, the environmental baseline for the action area, the effects of the ACOE flood control channel, and the cumulative effects, it is the opinion of NMFS that the ACOE project action is not likely to jeopardize the continued existence of the Federally endangered Southern California steelhead ESU and is not likely to destroy or adversely modify designated critical habitat.

INCIDENTAL TAKE STATEMENT

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with an Incidental Take Statement.

The measures described below are nondiscretionary, and must be undertaken by the ACOE so that they become binding conditions of any grant or permit issued to the County, as appropriate, for the exemption in section 7(o)(2) to apply. The ACOE has a continuing duty to regulate the activity covered by this incidental take statement. If the ACOE (1) fails to assume and implement the terms and conditions or (2) fails to require the County to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the County must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement (50 CFR 402.14(i)(3)).

I. Extent of Take

The NMFS believes the proposed ACOE flood control project on Mission Creek, Santa Barbara County, California, may result in the incidental take of steelhead. Any incidental take resulting from the ACOE flood control project will mostly likely be limited to outmigrating smolts or rearing juveniles located within the project area. Incidental take in the form of harassment, harm, or mortality could occur if fish are unable to migrate through the project area. In addition, incidental take could occur in the form of "harassment, collection capturing and/or mortality" if it becomes necessary to relocate individuals out of the project area. It is anticipated that relocation will occur on an annual basis during project construction (3 yrs). NMFS expects that mortality of fish due to handling during relocation will probably be less than 10 percent of captured fish.

Juveniles have been observed in scour pools within the project area. If juveniles are found prior to construction or maintenance activities, ACOE or the County shall relocate them. Conservatively, NMFS expects that less than 10 juveniles will be located in the project area each year at the time of project construction activities. Thus, NMFS does not anticipate mortality of rearing juveniles beyond one individual per year.

As discussed above, the majority of outmigration by smolts is expected to occur prior to the start of project construction. Continuous surface water persists into June only during years with relatively high rainfall. Even if these conditions occur, diversions will require only 1 to 4 days for construction. Because of the timing of diversion activities and limited time period for possible impacts, only a small number of smolts are expected to be present in the project area. NMFS anticipates that no more than 10 smolts per year, will need relocation. Assuming 10% mortality due to handling, 1 individual smolt will be harmed or killed per year of construction activities due to relocations. No harm or mortality should occur to smolts as a result of maintenance activities.

The accompanying biological opinion does not anticipate any form of take that is not incidental to the proposed project action. This Take Statement anticipates no mortality beyond one juvenile and one smolt during any year. If recurrent mortality occurs, or if mortality beyond 10 percent of steelhead being relocated (not to exceed 1 juvenile and 1 smolt per year), the ACOE shall reinitiate consultation.

II. Effect of Take

In the accompanying biological opinion, NMFS concluded that the anticipated level of take associated with the project action is not likely to jeopardize the continued existence of the Federally endangered Southern California steelhead ESU.

III. Reasonable and Prudent Measures

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize and monitor incidental take of steelhead:

1. The ACOE shall avoid and minimize impacts to steelhead from construction and maintenance activities.

2. The ACOE and County shall minimize the extent of permanent changes to instream and riparian habitat.

3. The ACOE and County shall minimize cumulative impacts and/or delays to fish migration in Mission Creek.

4. The ACOE and County shall monitor the project area to ensure correct project implementation and to minimize the take of steelhead incidental to project operations.

IV. TERMS AND CONDITIONS

In order to be exempt from the take prohibitions of the ESA, the ACOE must comply and/or ensure that the County complies with the following terms and conditions, which implement the reasonable and prudent measures described above and outline reporting/monitoring requirements. These terms and conditions are non-discretionary:

1. The following terms and conditions implement reasonable and prudent measure No. 1.

A. ACOE shall complete any construction activities occurring downstream of Yanonali Street between June 1 and November 30 of any year.

B. ACOE shall complete any construction activities occurring upstream of Yanonali Street between June 1 and November 30 of any year if continuous surface flow (or more than ½ inch water depth in Caltrans channel immediately upstream of project area) is present between Oak Park and the project area. If continuous surface flow is **not** present between Oak Park and the project area, activities may occur between April 15 and December 1 of any given year.

C. The County shall complete all maintenance activities between August 1 and October 31 of any given year.

D. Downstream of Yanonali Street, ACOE shall isolate and dewater only one side of the channel at a time to allow normal tidal flushing and unimpeded stream flows within the other half. Any water remaining within the work site shall be pumped through a filter to capture any silt and then into the wetted area surrounding the enclosure.

E. Upstream of Yanonali Street, ACOE shall divert all stream flow through pipe culverts. Culverts shall be smooth along the inside lining and at any culvert joints. Combined capacity of the culverts shall be at least 40 cfs. Any water remaining within the work site shall be pumped through a filter to capture any silt and then into the diversion channel.

F. A fishery biologist with expertise in the areas of fish biology and ecology, fish/habitat relationships, biological monitoring, and handling, collecting, and relocating salmonid species shall be responsible for all required monitoring of the project area. The biologist will survey the project area by snorkeling or visual observations from the embankments prior to any project activities, including all diversion, construction and maintenance activities. No diversion, construction or maintenance activities shall occur while steelhead are present.

G. The biologist shall capture any steelhead located in project areas and relocate the individuals to suitable instream habitat in Mission Creek. All relocations shall be coordinated with NMFS and CDFG and shall be conducted as described in the attached Biological Opinion.

H. The biologist shall monitor construction activities, instream habitat, and performance of sediment control/detention devices for the purpose of identifying and reconciling any condition that could adversely affect steelhead or their habitat. The biologist shall be empowered to halt work activity and to recommend measures for avoiding adverse effects to steelhead and their habitat.

I. The ACOE biologist shall contact NMFS (Anthony Spina, 562-980-4045) immediately if one or more steelhead are found dead or injured. The purpose of the contact shall be to review the activities resulting in take and to determine if additional protective measures are required. Subsequent notification must also be made in writing to NMFS (501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802) within five days of noting dead or injured steelhead. The written notification shall include the date, time, and location of the carcass or injured specimen, a color photograph, cause of injury or death, and name and affiliation of the person who found the specimen.

J. When practical, ACOE and the County shall use existing points of ingress or egress, or perform work from the top of the creek banks, for the purposes of avoiding work and heavy equipment in flowing water, and disturbing creek bank vegetation, and instream habitat.

K. Erosion control and sediment detention devices shall be incorporated into the ACOE project and implemented at the time of the project action. These devices shall be in place during construction, maintenance, and after if necessary, for the purpose of minimizing sediment and sediment/water slurry input to flowing water. The devices shall be placed at all worksites where likelihood of sediment input exists. The devices shall be maintained at least once daily. Sediment collected in the devices shall be disposed of off site.

L. Refueling of heavy equipment and vehicles will occur only within a designated area where potential spills can be readily contained. Equipment shall be checked and maintained to prevent leaks of fuels, lubricants or other fluids into the stream.

2. The following terms and conditions implement reasonable and prudent measure No. 2.

A. The ACOE shall photograph the project site before, during and immediately after the project is completed and develop a reference of instream and riparian habitat characteristics.

B. The ACOE shall insure substrate, representative of natural conditions, are present in the channel following construction activities. The basis for natural conditions shall be based on planned geotechnical surveys and pebble counts completed at locations within the project area that are most representative of natural conditions (e.g., between Ortega and De la Guerra Streets, between Bath and Cota Streets, upper end of oxbow below Gutierrez).

C. The County shall insure that representative types and sizes of substrate, such as small rocks or boulders, are present in the channel following maintenance activities.

D. Following construction activities, ACOE shall construct a lowflow channel that extends the length of the project area and that reflects what would be formed through natural processes.

E. Following maintenance activities, the County shall construct a lowflow channel that extends the length of the project area and that reflects what would be formed through natural processes.

F. The ACOE shall minimize disturbance to riparian and upland vegetation. All native vegetation removed for project activities will be disposed of off site or utilized during post construction revegetation. The ACOE shall implement a full re-vegetation plan including planting of at least 120 trees on channel sideslopes, at least 330 trees in habitat expansion area and hydroseeding with native grasses and shrubs.

G. The ACOE shall monitor growth and survival at the revegetated sites for 5 years following completion of project construction for the purpose of assessing the growth of the plantings or seedlings. The County shall photograph each site during each inspection.

3. The following terms and conditions implement reasonable and prudent measure 3.

A. ACOE shall develop a Streamflow Monitoring Plan, to be approved by NMFS, with the purpose of documenting flow conditions within the completed flood control channel. The plan shall include monitoring of stream flows, benchmark water velocities and depths, interactions between rock baffles and the lowflow channel, and any opportunistic observations of steelhead migration. The monitoring plan shall be completed, and approved by NMFS prior to the start of any project activities.

B. Based on methods outlined in the monitoring plan, all monitoring data shall be collected and compiled as soon as is practicable, based on streamflows,

within a time period not to exceed five years following construction of the flood control channel.

C. If the information collected during monitoring indicates that the flood control channel is not providing suitable conditions for upstream steelhead migration, the ACOE shall modify the channel, as necessary, to provide passage.

D. ACOE shall complete hydraulic analyses to characterize existing flow conditions within the Caltrans channel located immediately upstream of the project area.

4. The following terms and conditions implement reasonable and prudent measure 4.

A. The ACOE shall provide a written monitoring report to the NMFS within 15 working days following each fish relocation effort. The report shall include: the number and size of steelhead relocated from the project site, a specific description of locations where fish are relocated to, the number and size of steelhead relocated to each location, a description of any problem encountered during relocation, the number and size of any steelhead killed or injured during relocation, and any effect of the project action on steelhead that was not previously considered.

B. The ACOE shall provide a written monitoring report to the NMFS within 20 working days following completion of the project action of each work year. The report shall include the number of steelhead removed from the project site and killed or injured during the project action and biological monitoring; a description of any problem encountered during the project or when implementing terms and conditions; the number and size of steelhead noted and relocated; any effect of the project action on steelhead that was not previously considered; and pre- and post-project photographs documenting compliance with Reasonable and Prudent Measures No. 1 and 2.

C. The ACOE shall provide a written report describing results of the revegetation measures to the NMFS within 20 working days following completion of revegetation. The report shall include a description of the sites planted or seeded, the area (ft^2) revegetated at each site, a plant palette for each site, planting or seeding methods, and pre- and post-planting color photographs of each site.

D. The ACOE shall provide a written report describing the results of the revegetation measures as observed during annual site inspections to NMFS by August 15 of each monitoring year. The report shall include the color photographs taken of each site during each inspection, the color photographs taken before and after implementation of the project, survival and growth of plantings or seedlings, and observations noted by the biologist.

E. The ACOE shall provide a written report describing the results of the Streamflow Monitoring to NMFS by August 15 of each monitoring year. The report shall include interpretation and data for stream flows, water velocities, water depths, and baffle observations.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

NMFS recommends the following conservation recommendations to be carried out by the ACOE and/or the County for the Lower Mission Creek Flood Control Channel:

1. Despite the additional flood control protection provided by the ACOE project, NMFS encourages the City, County and ACOE to strive towards restoring Mission Creek to more natural habitat in the future. In order to provide natural habitat, which would also provide the needed flood control protection, both the creek channel and surrounding flood plain would need to be increased, and banks would need to be sloped back. Therefore, the City, County and ACOE need to limit further development within the floodplain and pursue acquisition of existing properties along the creek.

2. Implementation of measures to provide improved fish passage through the cement channel located directly upstream from the project location.

3. Implementation of measures to provide improved fish passage through Mission and Rattlesnake Debris Basins.

4. Implementation of measures to provide improved fish passage through the Botanical Gardens.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the NMFS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the ACOE's request for consultation dated June 20, 2000. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately. During reinitiation, NMFS, ACOE and the County shall review and modify construction and/or maintenance techniques, reassess the techniques used for fish relocations, modify the placement of side baffles and ledges to provide the projected benefits for steelhead, and assess need for implementation of recommended conservation measures.

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APPENDIX - B-2

CORRESPONDENCE RELATED TO ENDANGERED & THREATENED SPECIES

LOWER MISSION CREEK FLOOD CONTROL PROJECT SANTA BARBARA, CALIFORNIA

a. Letter to USFWS, dated, June 21, 2000
b. Letter to NMFS, dated, June 16, 2000
c. Letter from the National Fisheries Service, dated, March 21, 2000
d. Letter to USFWS, dated December 20, 1999
e. Letter to NMFS, dated December 20, 1999
f. Letter from USFWS, dated December 8, 1997

SEPTEMBER 2000

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

June 21, 2000

Office of the Chief
Environmental Resources Branch

Ms. Diane Noda
Field Supervisor
US Fish and Wildlife Service
2493 Portola Road, Suite B
Ventura, California 93003

Dear Ms. Noda:

The U.S. Army Corps of Engineers (Corps) is submitting this revised Biological Assessment (BA) pursuant to Section 7 (a)(3) of the Endangered Species Act of 1973, as amended, (16 U.S.C. A. §§ 1531 *et seq.*) The Corps previously submitted a BA in December 1999 to your office with the draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR), for the proposed Lower Mission Creek Flood Control Project in Santa Barbara, California. Since the release of the draft EIS/EIR the project design has been modified to accommodate numerous changes. These modifications include: extension of the bypass culvert from 540 to 830 feet in length and a change in size and orientation of a weir to control the movement of water into the culvert.

The proposed project area may have potential affect on tidewater gobies (*Eucyclgobius newberryi)*. Mitigation measures have been identified to minimize impacts to tidewater gobies from the proposed project.

Informally, the Corps has coordinated the proposed modification with your staff. At the request of your office and other concerned resource agencies U.S. National Marine Fisheries Service (NMFS) and California Coastal Commission (CCC) the Corps has performed additional analysis for hydrology of the stream with the project and without the project. Therefore, the BA has been revised to incorporate revised project related information. The Corps is including supporting documents: Biological Assessment (for tidewater gobies); Mitigation Monitoring Plan; Revised Project Description; Hydraulics/Engineering analysis; Biological Assessment for Steelhead (*Oncohrynchus mykiss*); the project plans; and supporting plans and drawings.

The BA provides additional information and impact analysis related to the modification to the project design. Environmental commitments and mitigation features also address similar efforts to minimize adverse effects to tidewater gobies, which also occupy the estuarine portion of Mission Creek.

The Corps has also submitted a revised BA to the NMFS for steelhead, which is enclosed also for your review and information. Your assistance in this consultation and preparation of a Biological Opinion to refine the commitments presented here are much appreciated.

The Corps requests your office to expedite the Section 7 procedure, and desires to obtain the Biological Opinion by the third week of July 2000 in order to meet the critical timeframe for submittal of the Feasibility Report and the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Water Resources Development Act (WRDA) of 2000. The EIS/EIR should include the biological opinion from your office and that the National Marine Fisheries Service, and the California Coastal Commission's concurrence with the Coastal Consistency Determination (CCD) for the proposed project. The California Coastal Commission requested that the Corps include the biological opinions with the information provided to them prior to the public hearing on the CCD for the proposed project. The California Coastal Commission's (CCC) hearing is scheduled between August 7 and 11, 2000. The CCC stated that they would need all project related information including the biological opinion two to three weeks prior to their public hearings.

The WRDA is the legislation through which Congress authorizes the Secretary of the Army to construct various projects for improvements to rivers and harbors of the United States, and for other purposes. It is critical for the City and the County of Santa Barbara and the residents of the Mission Creek Floodplain that the Corps obtain approval for the construction of this project as soon as possible. The last date that the Los Angeles District can submit documents identified in the above paragraph for inclusion in WRDA 2000 is August 31. If we miss this submittal date, the project authorization could be delayed until year 2002 or beyond. We request you give special consideration of review of this biological assessment and expedite preparation of the biological opinion.

We greatly appreciate your continuous cooperation. Thank you for your assistance with this proposed project. If you have questions, please contact Dr. John E. Moeur, the biologist assigned to this project at (213)-452-3874.

Sincerely,

Robert E. Koplin, P. E.
Chief, Planning Division

Enclosures

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

June 16, 2000

Office of the Chief
Environmental Resources Branch

Mr. Rodney R. McInnis
Acting Regional Administrator
National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

Dear Mr. McInnis:

Pursuant to Section 7 (a)(3) of the Endangered Species Act of 1973, as amended, (16 U.S.C. A. §§ 1531 *et seq.*), the U.S. Army Corps of Engineers (Corps) on December 20, 1999 requested initiation of formal consultation concerning a proposed flood control project on the lower portion of Mission Creek, in Santa Barbara, California. The segments of this coastal stream within the area of potential effect was regarded as a migratory corridor for steelhead (*Oncohrynchus mykiss)*. The Corps envisions construction activities and timing necessary to implement them which may cause temporary, adverse impacts to steelhead. A Biological Assessment (BA) was submitted to your office with the Draft EIS/EIR in December 1999. The project related impacts to steelhead and mitigation measures to minimize impacts were identified. Since then, the project has been modified, therefore, additional impact analysis and mitigation measures are included with this submittal.

During many subsequent discussions your staff requested additional technical information to determine impacts to steeelhead of the proposed project prior to preparation of a Biological Opinion. The Corps has performed additional analysis for hydrology of the stream with the project and without the project. Therefore, the BA has been revised to incorporate revised project related information. The Corps is including supporting documents: Mitigation Monitoring Plan, Biological Assessments (for steelhead); Revised Project Description; Hydraulics/Engineering analysis; Biological Assessment for gobies; the project plans; and supporting plans and drawings.

The enclosed submittal supplements the BA as requested. It includes information about the flow regime through the existing oxbow channel, how a passive weir would maintain that flow regime until discharges reach the mean annual flood event (640 ft^3/sec), water surface profiles, longitudinal profiles of the creek bed, changes of sedimentary regime in the creek, rating curves at representative cross-sections of the stream, details of environmental commitments to minimize incidental take of steelhead, and further designs for structural

features intended as compensatory mitigation for that affect on steelhead. Please note, these commitments and mitigation features also address similar efforts to minimize adverse effects to tidewater gobies (*Eucyclogobius newberryi*), which also occupy the estuarine portion of Mission Creek. The Corps has developed mitigation measures and environmental commitments to minimize/avoid impacts to the Federally listed species to the maximum practicable extent.

Informal discussion between biologists and hydraulic engineers from both our agencies has already resolved numerous questions about project design and its implementation. The Corps has concluded that construction of the preferred flood control design and its subsequent maintenance may affect adult steelhead during upstream migration in Mission Creek, and could possibly affect smolt as they make their way to the ocean. Both effects would possibly come about through the action of supervised relocation from areas of imminent activity to suitable refuges. Your assistance in this Consultation and preparation of a Biological Opinion to refine the commitments presented here are much appreciated.

The Corps requests your office to expedite the Section 7 procedure, and desires to obtain the Biological Opinion by the third week of July 2000 in order to meet the critical timeframe for submittal of the Feasibility Report and the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Water Resources Development Act (WRDA) of 2000. The EIS/EIR should include biological opinion from your office and the U.S Fish and Wildlife Service (USFWS), and the California Coastal Commission's concurrence with the Coastal Consistency Determination (CCD) for the proposed project. The California Coastal Commission requested that the Corps include the biological opinion with the information provided to them prior to the public hearing on the CCD for the proposed project. The California Coastal Commission's (CCC) hearing is scheduled between August 7 and 11, 2000. The CCC stated that they would need all project related information including the biological opinion two to three weeks prior to their public hearings.

The WRDA is the legislation through which Congress authorizes the Secretary of the Army to construct various projects for improvements to rivers and harbors of the United States, and for other purposes. It is critical for the City and the County of Santa Barbara and the residents of the Mission Creek Floodplain that the Corps obtain approval for the construction of this project as soon as possible. The last date that the Los Angeles District can submit documents identified in the above paragraph for inclusion in WRDA 2000 is August 31. If we miss this submittal date, the project authorization could be delayed until year 2002 or beyond.
We request you give special consideration of review of this biological assessment and expedite preparation of the biological opinion.

We greatly appreciate your continuous cooperation. Thank you for your assistance with this proposed project. If you have questions, please contact Dr. John E. Moeur, the biologist assigned to this project at (213)-452-3874.

Sincerely,

Robert E. Koplin, P. E.
Chief, Planning Division

Enclosures

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

MAR 21 2000

For Your Response
Please refer to:

F-LB-00-05:KAJ

Joy Jaiswal
Ed Demesa
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, California 90053-2325

Dear Ms. Jaiswal and Mr. Demesa:

The National Marine Fisheries Service (NMFS) has reviewed the Army Corps of Engineers' (ACOE) Draft Feasibility Report, DRAFT EIR/EIS, and March 2, 2000, modifications to the project description for the Lower Mission Creek Flood Control Project. The proposed project involves the construction and maintenance of a flood control channel along the lower 1.2 miles of Mission Creek in the City of Santa Barbara, Santa Barbara County, California. Mission Creek is located in the Southern California Evolutionarily Significant Unit (ESU) for the federally endangered steelhead (*Onchorynchus mykiss*) and is included in steelhead critical habitat.

On December 21, 1999, NMFS received a request from ACOE to initiate formal section 7 consultation in accordance with the Endangered Species Act (ESA). On January 17, 2000, NMFS informed ACOE that information regarding project maintenance, in addition to project construction, would be required prior to initiation of formal consultation. Further information on project maintenance has still not been received. Upon further review, we have determined that a detailed project description, beyond the conceptual plans provided in the documents mentioned above, is also lacking at this time. In order for NMFS to analyze possible effects of the proposed project on endangered steelhead and critical habitat, the ACOE needs to provide the following information on design, construction and maintenance:

1. Cross sections and longitudinal profiles of the stream channel throughout the project area as would be depicted in final or close-to-final design drawings.

2. A comprehensive hydraulic analysis in order to analyze project impacts on steelhead migration through the project area.

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3. A more detailed description of how and when construction (i.e., water diversions, destruction and removal of existing bank stabilization treatments and cement channels, construction of proposed concrete walls) would be implemented, including timing and scheduling of all actions, a list of equipment that would be used and how, and any measures that will be taken to avoid, minimize or mitigate for adverse effects to steelhead and/or critical habitat during those actions.

4. Proposed maintenance procedures including all maintenance actions that could be implemented (i.e., channel grading, sediment excavation, vegetation removal, structural repair), timing and scheduling of those actions, a list of equipment that would be used and how, and any measures that will be taken to avoid, minimize or mitigate for adverse effects to steelhead and/or critical habitat during those actions.

5. Detailed plans for steelhead monitoring and relocation (as necessary), and proposals for habitat creation or resting sites within the project area.

We appreciate the opportunity to review the proposed project at this time and look forward to coordinating with ACOE during development of the above information. Korie Johnson is the principal NMFS contact for this project. Please call her at (562) 980-4199 with any questions.

Sincerely,

Rodney R. McInnis

Rodney R. McInnis
Acting Regional Administrator

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

December 20, 1999

Office of the Chief
Environmental Resources Branch

Ms. Diane K. Noda
Ecological Services Field Supervisor
U. S. Fish and Wildlife Service
2493 Portola Road, Suite B
Ventura, California 93003

Dear Ms. Noda:

Pursuant to Section 7 (a)(3) of the Endangered Species Act of 1973, as amended, (16 U.S.C. A. §§ 1531 *et seq.*), the U.S. Army Corps of Engineers (Corps) requests initiation of formal consultation concerning a proposed action, to be funded in part by the Federal Government, which may affect individuals and a local population of tidewater gobies (*Eucyclgobius newberryi*), a species protected as endangered by the Endangered Species Act. The action proposed would implement flood control along the lower-most region of Mission Creek, in Santa Barbara, California. A Biological Assessment which addresses potential effects of project design, the construction activities and timing necessary to implement it, environmental attributes inherent in the design of the project, and measures to minimize probable effects to tidewater gobies accompanies this formal request.

The preferred flood control design would widen the creek bed, expand the estuarine portion of the creek where gobies forage, restore a natural bottom to Mission Creek, and replace invasive weedy perennials which now dominate the banks with native species adapted to the layered structure of native stream bank vegetation. Unavoidable and incidental take of tidewater gobies would occur when fish would be seined from within a temporary construction exclosure built to accommodate requirements for construction along the banks of the estuary. The beneficial effects to goby habitat and the avoidance of additional take during construction upstream of the estuary through implementation of environmental commitments should render the overall project of negligible adverse consequence to tidewater gobies.

Informal consultation between biologists from both our agencies has already resolved numerous questions about project design and its environmental benefits and consequences. The Corps believes impacts to tidewater gobies cannot be fully avoided, however. Your assistance in this Consultation and preparation of a Biological Opinion to refine the commitments presented here are much appreciated.

Thank you for your assistance with this proposed project. If you have questions, please contact Dr. John E. Moeur, the biologist assigned to this project at (213)-452-3874.

Sincerely,

for Robert E. Koplin, P. E.
Chief, Planning Division

Enclosure

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

December 20, 1999

Office of the Chief
Environmental Resources Branch

Mr. Rodney R. McInnis
Acting Regional Administrator
National Marine Fisheries Service
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

Dear Mr. McInnis:

Pursuant to Section 7 (a)(3) of the Endangered Species Act of 1973, as amended, (16 U.S.C. A. §§ 1531 *et seq.*), the U.S. Army Corps of Engineers (Corps) requests initiation of formal consultation concerning a proposed action, to be funded in part by the Federal Government, being planned at a coastal stream known to be a migratory route for steelhead (*Oncohrynchus mykiss)*, a species protected as endangered by the Endangered Species Act. The action proposed would implement flood control along the lower-most region of Mission Creek, in Santa Barbara, California. A Biological Assessment which addresses potential effects of project design, the construction activities and timing necessary to implement it, environmental attributes inherent in the design of the project, and measures to avoid completely possible adverse effects to steelhead accompanies this formal request.

The preferred flood control design would widen the creek bed, expand the estuarine portion of the creek where steelhead first enter it, restore a natural bottom to Mission Creek, create fields of boulders in the creek bottom to slow water velocities and establish heterogenous water conditions where steelhead could find shelter, and restore native stream bank vegetation, both understory and canopy species. Mechanized equipment needed during construction would be excluded from flowing water between December 15 and the end of March. A temporary construction exclosure built to accommodate requirements for construction along the banks of the estuary would leave half the channel unobstructed, so steelhead could pass either direction without hindrance. Implementation of environmental commitments to avoid any adverse effects during construction upstream of the estuary would include construction schedules outside steelheads' migratory patterns, careful monitoring of construction areas by a knowledgeable fisheries biologist, and use of silt curtains. The design would carry flood waters past the natural oxbow of Mission Creek through a trio of box culverts, each 10 feet high by 6 feet wide. Initial calculations indicate this bypass structure should have no influence of any kind on migratory behavior of steelhead.

Informal consultation between biologists from both our agencies has already resolved numerous questions about project design and its environmental benefits and consequences. The Corps believes the preferred flood control design can be implemented without any adverse effect to steelhead in Mission Creek. Your assistance in this Consultation and preparation of a Biological Opinion to refine the commitments presented here are much appreciated.

Thank you for your assistance with this proposed project. If you have questions, please contact Dr. John E. Moeur, the biologist assigned to this project at (213)-452-3874.

Sincerely,

for Robert E. Koplin, P. E.
Chief, Planning Division

Enclosure

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

December 8, 1997

Robert S. Joe
Chief, Planning Division
Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Subject: Species List for Mission and Rattlesnake Creeks, Santa Barbara County, California

Dear Mr. Joe:

This letter is in response to your request for information on listed, proposed, or candidate endangered and threatened species or species of concern which may be present within the area of the subject project in Santa Barbara County, California. Your request was dated November 26, 1997 and was received by the U.S. Fish and Wildlife Service (Service) on December 3, 1997. The U.S. Army Corps of Engineers (Corps) is preparing a feasibility study of flood control plans for lower Mission Creek in the City of Santa Barbara. This letter fulfills the requirements of the Service under section 7(c) of the Endangered Species Act of 1973, as amended (Act).

To the best of our knowledge, only the threatened tidewater goby (*Eucyclogobius newberryi*) occurs within the area of the subject project. We recommend that you contact the California Department of Fish and Game at (562) 590-5137 for information on other species of concern that may occur in the project area.

In July 1995, the Service issued a revised policy regarding candidate species. Under the new policy, "candidate" species are those taxa for which the Service has sufficient information to support the publication of a proposal to list. These species were formerly known as "category 1 candidates." Former "category 2 candidates" are now "species of concern." This change should not be construed as a change in the biological status of those species, nor a change in the level of concern that should be afforded these species during the evaluation of the effects of an action. The Service will continue to monitor sensitive species regarding the need for listing and will rely on data bases maintained by other agencies and The Nature Conservancy as a major source of information. Species can be added to the candidate list by the Service through submittal of appropriate information to, and approval by, the Director.

The Corps, as the lead Federal agency, has the responsibility to review its proposed activities to determine whether any listed species or designated critical habitat may be affected. Such a determination must be made through development of a biological assessment in the case of projects that require preparation of an environmental impact statement. If the Corps determines that a listed species or designated critical habitat may be affected, the Corps should request, in writing through our office, consultation pursuant to section 7 of the Act. Informal consultation may be used to exchange information and resolve conflicts with respect to listed species and designated critical habitat prior to a written request for formal consultation. During this review process, the Corps may engage in planning efforts but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act.

Should you have any questions, please contact Kirk Waln of my staff at (805) 644-1766.

Sincerely,

Diane K. Noda

Diane K. Noda
Field Supervisor

APPENDIX - C

REVISED MODIFIED HABITAT EVALUATION PROCEDURE ANALYSIS

LOWER MISSION CREEK FLOOD CONTROL PROJECT SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

HABITAT EVALUATION PROCEDURE (HEP)
REVISED SINCE DECEMBER 1999 —
COMPUTATION OF IMPACTS TO EXISTING CONDITIONS, AND EXPECTATIONS OF STRUCTURAL MITIGATION FEATURES AND INCIDENTAL ENVIRONMENTAL BENEFITS CAUSED BY THE PREFERRED ALTERNATIVE FOR FLOOD CONTROL; LOWER MISSION CREEK, SANTA BARBARA, CALIFORNIA

1. INTRODUCTION

1.1 Revisions to the Recommended Alternative Dictate Revised HEP

An edition of this numerical evaluation of impacts and benefits attributable to flood control plans for Lower Mission Creek was prepared for and included in the Draft EIS/EIR, published in December 1999. Subsequently, the project's design has been modified in diverse and substantial ways. The need for clarification of project description by the National Marine Fisheries Service, the US Fish and Wildlife Service, the California Coastal Commission, the California Department of Fish and Game, and local environmental advocacy groups led to those modifications. They, in turn, necessitated a complete re-evaluation of environmental effects anticipated from the project. This revised HEP analysis is the result. It differs so completely from the report published in December 1999 that the traditional practice of indicating textual revisions from the previous document is impractical. Nearly the entire HEP analysis would be thus marked.

In brief overview, the main project revisions involve six facets of its design or subsequent maintenance:

- elongation of the bypass culvert;
- control of discharges smaller than the mean annual event, 640 ft^3/sec;
- inclusion of additional structural features to mitigate for impacts to Federally protected species;
- exclusion of a manufactured wetlands proposed earlier;
- changes of remnant properties to be used as habitat expansion zones, and;
- modifications of the maintenance procedures which could be expected once the flood control project has been completed.

This HEP analysis itself has been restructured and it now treats the project area as though it were made up of three distinct pieces. These "reaches" (no tributaries enter Mission Creek within the project area) identify parts of the project which would have one of three finished widths to the streambed based on the design width of the creek bottom for Aternative12:

Canon Perdido Street to Haley Street - reach #1	43 feet wide between toe walls
Haley Street to the freeway - reach #2	50 feet wide between toe walls
Yanonali Street to Cabrillo Boulevard -reach #3	60 feet wide between toe walls

The three reaches, 43', 50', and 60' wide respectively, will become the basis for comparison of habitat quality anticipated for the project and the future in the absence of a flood control project.

1.2 Impaired Ecological Links Between Aquatic and Stream Bank Habitats

A very extensive scientific literature, whose roots trace back into the last decades of the previous century, has explored all imaginable facets of the ecological phenomenon termed seral succession. Many natural processes, some of strictly biological nature and others of non-biological origin (having to do with soil types, topography, rainfall, seasonal changes in climate, and so forth) occur together to determine the suite of organisms that occupy any given biological setting, and the nature of their habitats in that setting. A broadly general ecological principle arose from the predictable outcome of these various processes: with sufficient time and without periodic events that reset the inherent progression from stage to stage, a natural group of interacting organisms will become established at a given place. Such assemblages of plants, animals, fungi, and bacteria constitute distinctive and recognizable biological communities. Moreover, the inhabitants of that first community will steadily modify their environment in a way that favors the ecological needs of other species that have the capacity to replace all those which made up the original community. In effect, one whole group of organisms pulls themselves up by their own bootstraps so to speak, only to create environmental conditions which allow a different group of species to do the same thing. Seral succession leads through a sequence of one community type after another but eventually to a stable community which persists so long as the surrounding environment stays roughly unchanged. An environmental perturbation, such as a fire or sizeable flood or the diverse activities of humans, may partly destroy whatever biological community exists and thereby restart seral successional processes.

Historical environmental changes brought about by the human needs for agricultural lands and then their consolidation into urban Santa Barbara decimated the three ecological biological communities that would have been present along Mission Creek. The largest would have been a riparian gallery forest along its banks. Equally conspicuous and ecologically tied closely to the riparian corridor, a riverine community would have been home to numerous fresh water plants and animals. The most ecologically active community, an estuarine (and salt marsh) expanse where Mission Creek flowed into the ocean, would have been dominated by cord grass, pickleweed, and bulrushes.

Urban development along Mission Creek caused much degradation of these three biological groups. The stream banks now have only scattered and isolated vestiges of riparian species. There is no cohesive canopy of large trees (primarily cottonwood, sycamore, and white alder), nor is there a functional stratum of perennial shrubs (primarily willows, elderberry, and others) beneath those absent trees. The periodic and regular need to remove sediments, downed limbs, plant growth, and so forth keeps the riverine portion of the creek in an artificial and very early successional imbalance. The estuarine segment has been crippled ecologically by the hardened bottom in at least part of the channel, abrupt banks which prevent formation of any

kind of tidal creeks and mudflats, and complete removal of the numerous plant species that would normally inhabit the mouth of a coastal stream.

A modest simplification was invoked for the quantitative evaluations which follow. The riverine and the estuarine portions of Mission Creek are both regarded together as stream channel, i.e. aquatic habitat. Equating the two does not compromise the evaluation of either type.

1.3 Impacts and Mitigations for the Recommended Alternative

Although the environs now present along Lower Mission Creek lack high ecological value, the proposed structural flood control alternative (Alternative 12, Section 3 of the EIS/EIR) would cause permanent impacts to them. Specifically, the need to widen the existing streambed and to excavate the existing banks of Lower Mission Creek cannot be accomplished without complete loss of the extant features of each habitat which confer some ecological value. Habitat quality can be described by a numeric quantity of habitat units (explained in detail in section 4) and construction of a flood conveyance project alone would result in impacts measured in the difference between the value in habitat units before and after the project.

Yet Aternative12 also would incorporate specific design features of the proposed flood channel in addition to sufficient planting and landscaping to negate completely those impacts. Briefly, the impacts identified and the design features which offset them include:

Identified impacts

- Unavoidable, temporary impacts to steelhead and tidewater goby;
- Excavation of streambed, vegetation, and isolated pools preparatory to forming walls which will define the finished stream channel;
- Removing existing stream bank vegetation;
- Removing isolated native trees;
- Annual maintenance of stream channel;

Project design features

- Natural sediments to restore soft streambed throughout the project;
- Fields of boulders embedded in streambed;
- Structural features to mitigate impacts to both fish species and overall aquatic habitat;
- Expansion of estuary region of stream channel;
- Native trees and shrubs planted into riprap slopes above the stream channel;
- Native trees planted in clusters at locations of remnant properties atop the banks;
- Creation of a permanent pilot channel;
- Mosaic pattern of vegetation control;
- Abatement of giant reed (*Arundo donax*) and other invasive species.

As in December 1999, this revised HEP analysis draws extensively from the details in the relevant parts of the EIS/EIR, and has to be read in conjunction with and as an elaboration of that report. It makes no attempt to summarize project descriptions or the actual plans to implement these design features alluded to above.

Current existing conditions along the channel reflect maintenance as needed by Santa Barbara County Flood Control District, following guidelines described in a Programmatic General Permit (94-50851-MSJ) and issued by the Regulatory Branch of the USACOE. Specific maintenance procedures developed from that general permit were codified for 1997/98 into an addendum for routine maintenance of Mission Creek, which tiers from a programmatic EIR to analyze routine flood control maintenance activities within Santa Barbara County. Maintenance procedures have been revised since December 1999 and the analysis which follows gives projections of a future without project and with implementation of Aternative12 based on those new operational procedures. An appendix to the EIS/EIR, (Mitigation Monitoring Plan, Appendix H), contains these details.

This appendix presents details of these effects, quantifies and evaluates them, and summarizes numeric differences between impacts and environmental gains attributable to project design using a modified and abbreviated form of HEP, an analytical method originally developed by the U.S. Fish and Wildlife Service to measure changes to natural resources when land and water development projects are contemplated. This HEP appraises the ecological value of habitats identified along Lower Mission Creek. All native species with the contemporary potential to occur here are considered, not just a particular or notable species, such as steelhead (*Oncorhynchus mykiss*). Historical developments in the area permanently affected environmental conditions and, without intending to, have fully extirpated some species whose historic ranges probably included Mission Creek through Santa Barbara, such as red-legged frogs, southwestern pond turtles and tiger salamanders, southwest willow flycatchers, California sea blite, and salt marsh bird's beak. Their ecological requirements do not enter into this HEP analysis since they no longer occur within the project reach of Mission Creek.

2. PROJECTIONS OF HABITAT VALUE

The HEP analysis yields numbers. These values, Habitat Units (HU), are a means by which the net effects of a proposed action can evaluated. Very simple arithmetic leads to the numbers themselves, merely by adding, multiplying, subtracting, or dividing as appropriate. However, the sequence of those arithmetic steps can be quite intricate, and moreover they have to be repeated at considerable length to give HUs over a period of time. The ecological interpretations and conclusions derive from those HUs, but the results can be presented separately from the arithmetic which leads to those results. That is the arrangement followed here. Biological rationales, numeric results of HEP analysis, and interpretations of those results precede the intricate arithmetic. The reader who wishes first to understand how HUs were calculated should refer to Section 3 (Arithmetic of Habitat Evaluation), then return here.

2.1 Innate Processes

Each portion of this entire analysis proceeds from a basic supposition. Ecological trends and the reason they occur form the core of this assumption.

The biotic habitats which currently exist along Mission Creek are the direct result of climatic, fluvial, geological, and ecological processes at work on the one hand, and the modifications to the watershed and immediate surroundings of Mission Creek made to enhance human desires and needs at work on the other hand. Existing habitat circumstances of Lower Mission Creek reflect these contradictory influences. In the event no flood control project were implemented, these processes would not change in any fundamental way and therefore Lower Mission Creek would stay about as it is now in all respects, barring additional human modifications.

Most importantly, implementation of the proposed flood control project also would not alter those underlying processes. Flows down Mission Creek during the rainy season will still interact with boulder clusters in the streambed, rows of sizeable rocks, and ledges along the sides to induce heterogenous stream conditions and formation of sheltered pools. During drier seasons, flows along the proposed pilot channel will sustain aquatic organisms in that persistent stream course and growth of diverse plant species along it. Species of trees whose growth habit leads toward a sheltering canopy of high foliage, and species which grow toward a large shrubby habit would be selected for their overall suitability in this climate. The recommended plan would reinstate the raw materials for aquatic habitat and the assemblage of plant species ordinarily associated with it in coastal riparian biotic communities. The natural processes which shape those raw materials would set to work. Therefore, the creek and the banks above it would tend to evolve toward the ecological conditions which come about naturally because of these processes, despite being limited to the space between toe walls.

While neither the nature of these processes nor the manner by which they may interact can be described in a report of this type, the basis of this analysis requires they act to bring about, in a general way, the re-appearance of natural aquatic conditions in the creek bed and layered arrangement of plants along the riprap slopes. The HEP analysis makes numeric projections over the 50-year life span of the project stemming directly from this ecological supposition. It also allows for random changes of environmental conditions, where appropriate.

2.2 A Convention for Presentation of Results

Equations devised to arrive at these projections involve random fluctuations as a way to mirror the unpredictability of ecological processes from one year to the next, and the random components of the arithmetic make the results of calculations differ every time they are repeated. As a result, the numeric values which any single computation gives could be quite misleading, or could actually be quite close to a true and biologically relevant value. The way the various equations are linked to one another and incorporate random terms creates this procedural dilemma.

The HEP procedure used a composite number to resolve this dilemma, one by which all conclusions are drawn from a form of average habitat value. It requires doing the arithmetic over and over again. Each iteration of the arithmetic gives a simple average for aquatic or stream bank habitat projected over a 50 year period. Repetition of those arithmetic steps gives another, different average value, and a third time gives still a third average. On the assumption that a

reasonably large number of iterations will each give unique average values that on the whole are somewhere around the true and unknowable value, these comparison rely instead on the "whole" average value determined from the unique average of each of 100 separate repetitions of the entire suite of arithmetic steps. For these numerical comparisons, use of the word "average" means, in fact, the average of these 100 different averages.

The progression of changes can be seen much better by graphs. Again, any one set of numerical answers could also be quite misleading. All graphic summaries presented to illustrate differences depict results whose average value happened to come out extremely close (less than 0.003 HU different) to the overall averages above. It should be noted, though, that many different temporal patterns could have led to these same averages and thus these graphs must not be seen as the "correct" solution of all the equations. They merely represent a pattern of change in habitat quality over the project's lifetime, but one which comes very close to the best guess of the true value, i.e. the average of averages.

2.3 Aquatic Habitat

2.3.1 **Future conditions without a flood control project –** The description of existing aquatic habitat conditions (in habitat suitability indices, Table C-6, section 3) reflect the extent of urban manipulation of the streambed. Existing habitat quality in reach 1 = 0.40 HU, that in the second reach = 0.13 HU, while reach 3 has 0.20 HU of value. Adding values for all three reaches, total extant aquatic habitat quality = 0.73 HU. Scant shade cast by trees, proportionately larger areas of the streambed armored by concrete, and fewer scour pools in reaches 2 and 3 give them lower values compared to the upper reach.

As discussed at greater length in the text of Section 10 of the EIS/EIR, the perceived need by private landowners to fortify their own banks against erosion leads to more revetments at the sides of (and often actually within) the streambed. Changes in local hydrology which one owner's well-meaning efforts induce then cause bank erosion nearby. Historically, that second owner has then invested similarly. Over time, habitat quality would tend to decrease in a patchy and locally irregular manner. In the event no flood control project were built here, the decisions to make irregular and shifting investments in bank protection without an overall understanding of broader hydraulic effects would continue unchanged. As an unintended result habitat quality would be expected to decline from existing conditions.

In addition, maintenance needs by the County to retain the channel's current conveyance capacity would periodically lessen the already decreasing habitat quality of the aquatic habitat in Mission Creek. Historic rainfall patterns and the consequent accumulation of sediments should not change in any foreseeable way. The HEP analysis makes allowances for complete removal of sediments, the plants rooted in them, and such scour pools as have formed, over 35% of the streambed approximately every three years. Maintenance would be indicated when a section of the channel has lost about 15% of its capacity. Historically, this level of aggradation has occurred only in the portions of the creek upstream of the estuary, but no sediment removal has been needed in the estuary itself. The needs for more diligent maintenance in some years

compared to others ought to cause somewhat erratic fluctuations of aquatic habitat value.

2.3.2 **Future conditions with Alternative 12 –** The designs for the proposed project include mitigation features are intended to offset unavoidable adverse effects to tidewater gobies and steelhead, which both depend on the aquatic habitat of Mission Creek. These features would individually restore a small portion of overall habitat quality to a streambed that would, in their absence, be wider and basically flat all the way across. They were allotted a habitat suitability index, as indicated (Table C-1).

Table C-1. Increments of habitat suitability index (HSI) assigned to separate mitigation features that constitute part of the project design for Alternative 12. Section 10 of the EIS/EIR describes each feature and its implementation.

MITIGATION FEATURE	VALUE AS HSI	LOCATION WITHIN THE PROPOSED PROJECT
removal of concrete	0.05	scattered throughout all three reaches
side baffles	0.05	reaches 2 and 3
fish ledge and protected scour pool	0.15	reaches 2 and 3
fish ledge by itself	0.075	reach 3 (Mason Street to Cabrillo Boulevard)
ribs and side baffles together	0.075	reach 3 (Mason Street to Cabrillo Boulevard)
mid-stream clusters of boulders	0.25	reaches 1 2
pilot channel (& reconstructed after removal of sediments)	0.075	reaches 1 2

The design of the proposed channel would also require periodic maintenance. After successive years when deposition in the creek has not diminished its conveyance capacity, the County would perform minimal maintenance. This would involve mowing the larger plants in half the streambed one year, then mowing the other side the next year. In this mosaic fashion, herbaceous plants and small perennials would be encouraged to grow, especially among the side baffles and adjacent to ledges. The HEP analysis accounts for this annual reduction, by 50%, of habitat quality attributable to successional processes trying to reclaim the creek bed.

Since the design capacity cannot be accomplished within the allotted width except by the use of toe-walls, maintenance requirements could differ somewhat from the existing conditions. The County would still act when the creek's capacity has decreased by 15%, but would most likely remove sediments and plants throughout all of both reach 1 and 2. The HEP analysis calculates for loss of accumulated plant growth and surface roughness amounting to 100% of the streambed approximately every three years. In that event, the habitat quality reverts to that imparted by the mitigation features alone, with a small increment granted for increased shade as trees and shrubs on the banks grow in size. A maintenance cycle which requires removal of

sediments would be concluded by reconstruction of the pilot channel. Mechanized equipment, probably a grader with a 10 foot blade, would reshape the pilot channel where it had been prior to maintenance. The HEP analysis anticipates that natural hydraulic processes would soon establish and optimal alignment, given the constraining influence of the toe-walls, and that pilot channel's location and general shape would become a quasi-permanent feature of the creek bed.

2.3.3 **The projections compared** – Recall the distinction between the average of averages, from which conclusions about differences between Alternatives 12 and 1 are drawn, and the unique average which characterizes any single iteration of the arithmetic. Average of averages are used throughout.

Aquatic habitat would achieve higher values in each reach by implementation of the proposed project than would be the case in the future without the project (Table C-2).

Table C-2. Average of projections of habitat quality, in habitat units, of the aquatic habitat in Lower Mission Creek. Each is the average of 100 individual repetitions of the equations above.

REACH	PROPOSED FLOOD CONTROL DESIGN	FUTURE WITHOUT PROJECT
43 feet wide	0.55 HU	0.36 HU
50 feet wide	0.24 HU	0.11 HU
60 feet wide	0.29 HU	0.19 HU

The expectations for long term patterns of change in aquatic habitat value in each of the three reaches are shown (Fig. C-1). Within each reach values for Alternative 12 always rise for a few years from an initial value, which reflects the incremental contribution of each mitigation feature giving an overall starting value. Ecological processes then heighten aquatic habitat quality for a few years. Eventually, an approximate stable value can be seen – indicated by the

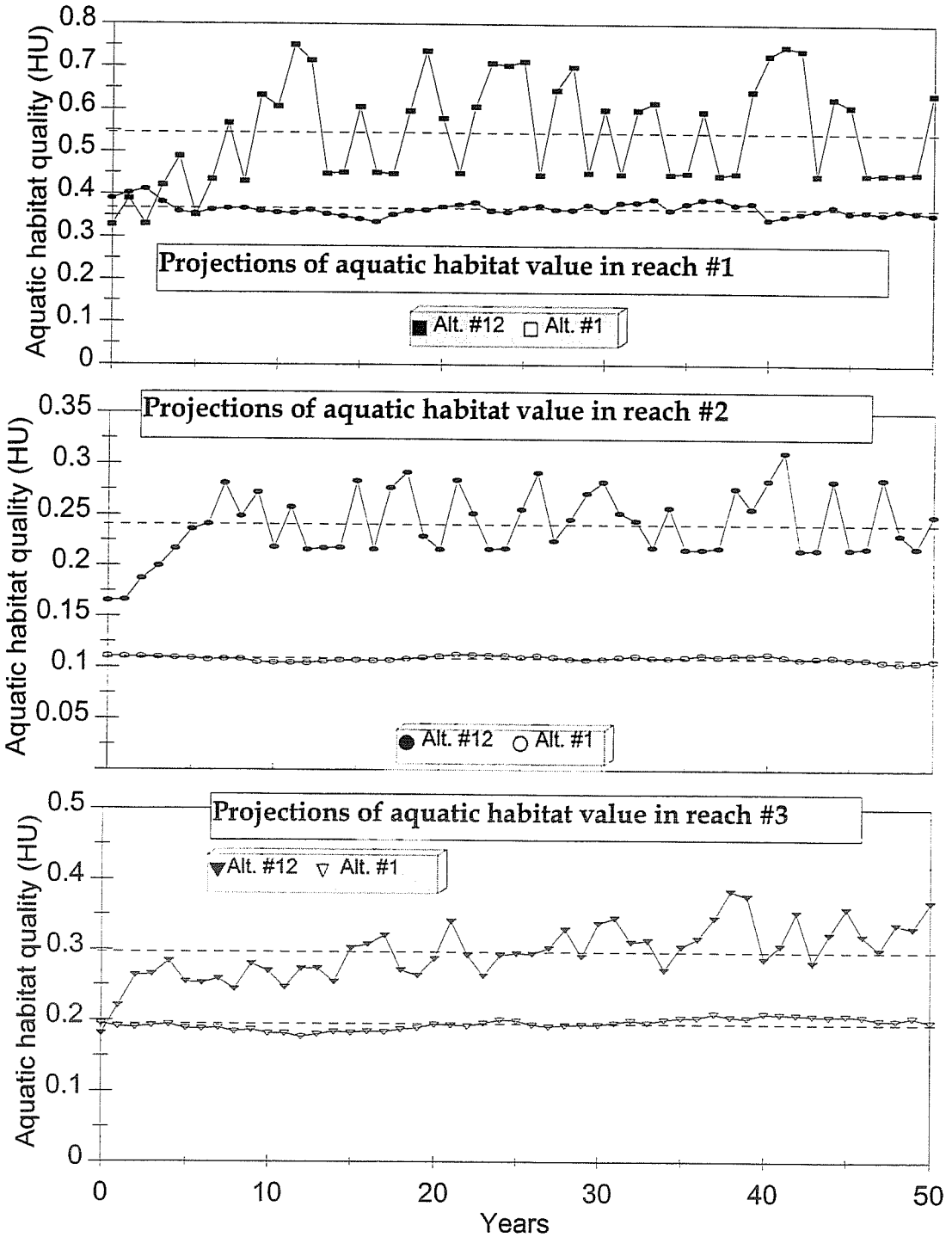


Fig. C-1. Aquatic habitat value projected for Alternatives 12 and 1 in Lower Mission Creek. Each panel shows a representative long term pattern of changing quality in the aquatic habitat for the recommended project (upper lines) and the future without project (lower lines) in reach 1, 2, or 3: upper, middle, or lower panel, respectively. The dotted line indicates the average of averages, as described in the text. Note the difference in scales of the three vertical axes.

average value and shown as dotted lines – even though variation would occur from year to year around the stable value. Future conditions without the recommended project also fluctuate somewhat around the long term average for each reach, least annual variability being evident in reach 2, reach 1 somewhat more prone to variability, and reach 3 most given to annual change. This reflects the combined effects of greater uniformity of existing hardened surfaces in reach 2 than the others and periodic maintenance in reaches 1 and 2 but not reach 3.

Note the propensity for the proposed project to experience sudden and precipitous drops in overall ecological value. This reflects the expected effects of sediment removal in reaches 1 and 2. Both Alternative 12 and the future without project also fluctuate somewhat unpredictably from one year to the next. Note also the slight pattern of long-term decline in habitat quality of the future without project in reaches 1 and 2, but not evident in reach 3. This seems in keeping with the more common application hardened revetments to the banks and margins of the streambed in these two portions of the creek com pared to the estuary.

Comparisons of the averages themselves indicate a net increase of aquatic habitat ecological value within each reach of the project. These stem directly from the mitigation features which the project includes. Average habitat values over the 50-year life of the project increase by 0.19 HU in reach 1, 0.13 HU in reach 2, and 0.10 HU in reach 3, 49%, 126%, and 52% higher than the future without project respectively.

2.4 Stream bank Habitat

2.4.1 **Future Conditions Without a Flood Control Project –** The description of existing stream bank conditions (in habitat suitability indices, Table C-6, section 3) also reflect the extent of diverse schemes to protect properties from erosive loss along the banks. The greater the area covered, and the more solidly by various means, the less conducive growing conditions become for native shrubs and trees. Along much of the project length, only invasive weedy species can tolerate existing bank conditions. Existing habitat quality in reach 1 = 0.25 HU (adding the contributions of both left and right banks together). Reach 2 has a total of 0.11HU. The estuary portion of the project area, reach 3, has 0.12 HU of value, combining both banks. Adding values for all three reaches, total extant stream bank habitat quality = 0.48 HU.

2.4.2 **Future Conditions with Alternative 12 –** The proposed design would include native shrubs and trees planted along the upper portions of the banks, into an area above the toe-walls and protected against scour by ungrouted riprap. About 65% of the finished banks would have this form of landscaping. Most would be upstream of Highway 101. Because of limitations of right of way, this arrangement of plants would trace rather narrow corridors along both banks, except at a few opportune spots adjacent and directly attached to the main corridors..

Final configuration of the creek's channel and banks would require acquisition of private properties at five separate locations. Those available properties would become habitat expansion zones. As planned, they would be perched atop the sloped banks and effectively expand the

riparian growth on to the overbank above the channel in locations where native plants to be established would form dense clusters. Canopy species would predominate, but these properties could also accommodate some understory shrubs and limited areas of native herbaceous plantings. Depending on results which emerge from the most refined hydraulics model for Mission Creek (the last phase of engineering design, but not yet even begun), three of those five habitat expansion zones could extend from near the toe to the top of the bank.

Some of the larger habitat expansion zones might also be suitable dual-purpose elements of project design. They are envisioned as passive recreational areas, well suited to bird watching, sketching, and observing the creek from above. Dual use of these sites would not diminish their ecological worth as expanded copses of stream bank habitat.

2.4.3 **The Projections Compared –** Habitat values of stream banks and habitat expansion zones have been added here. General expectations for habitat quality of the banks are also given most appropriately by averages. As before, 100 separate repetitions form the data for these average values. The proposed project would yield greater totals of habitat value of streambanks in reaches 1 and 2. Stream bank habitat within reach 3, the estuary, would remain essentially unchanged (Table C-3).

Table C-3. Average of projections of habitat quality, in habitat units, of the stream bank habitat in lower Mission Creek.

REACH	PROPOSED FLOOD CONTROL DESIGN	FUTURE WITHOUT PROJECT
43 feet wide	0.45 HU	0.24 HU
50 feet wide	0.26 HU	0.11 HU
60 feet wide	0.10 HU	0.12 HU

The expectations for long term patterns of change in stream bank habitat value are also shown as a composite, one panel for each of the three reaches (Fig. C-2). In all cases, the ecological value attributable to stream bank habitat with Alternative 12 starts out lower than the projection for the future without the flood control project. Within 5 years the natives to be planted would have grown enough to restore the existing values, except perhaps in the estuary. Despite fluctuations from one year to the next, the anticipation of good and bad growing years, the proposed project would attain higher quality than the future without project sometime between 3 and 8 years after its completion.

Comparison of the averages themselves indicates a net increase of ecological value due to bank vegetation. Both the planted riprap slopes above toe walls and the habitat expansion zones contribute to this outcome. Average habitat values over the 50-year life of the project increase

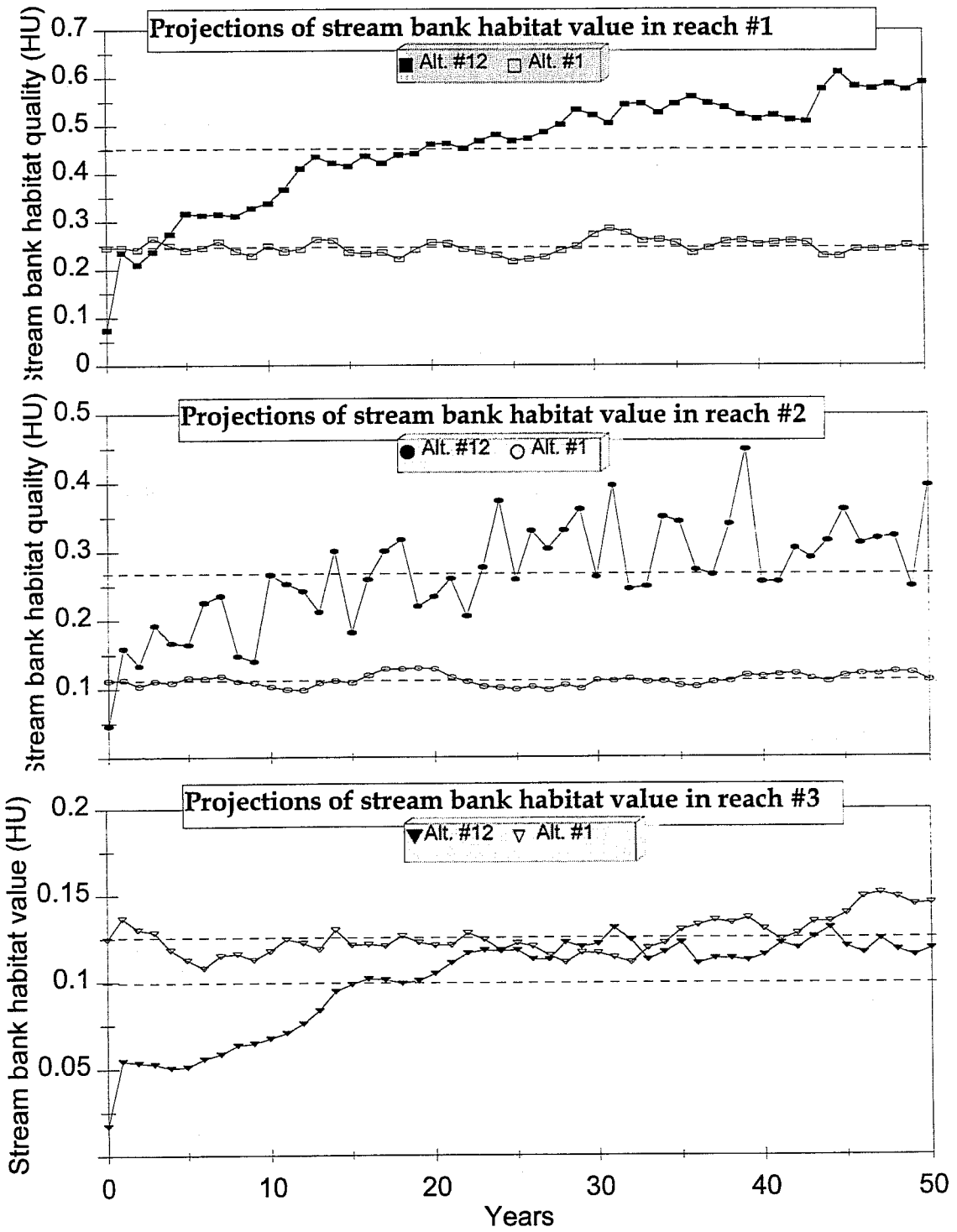


Fig. C-2. Stream bank habitat value projected for Alternatives 12 and 1 in Lower Mission Creek. Each panel shows a representative long term pattern of changing quality of stream bank habitat for the recommended project (upper lines) and the future without project (lower lines) in reach 1, 2, or 3: upper, middle, or lower panel, respectively. The dotted line indicates the average of averages, as described in the text. Note the difference in scales of the three vertical axes.

over the projections of future conditions without the project by 0.21 HU in reach 1, 0.15 HU in reach 2. A net decrease would prevail within reach 3: the proposed design of the project would yield 0.10 HU, while the future without that project should retain about 0.12 HU. The difference, -0.02 HU, would be negligible.

2.5 Summary of Flood Control Impacts and Project Design Benefits

Table C-4 compares long term projections for environmental effects on Lower Mission Creek, after a semblance of steady state has begun to prevail. In fact, the habitat quality of native vegetation planted both on the riprap stabilized banks and in habitat expansion zones should continue to increase slowly. Such refined projections are beyond the capacity of the rudimentary models used in this analysis.

The features which Alternative 12 include directly in the design plans are projected to yield more habitat units, aquatic and stream bank habitats combined equal 1.91 HU, than would be impacted during construction and subsequent maintenance of the proposed flood control project, 1.13 HU total of aquatic and stream bank vegetation for the projection of existing conditions. The net yield from Alternative 12, 0.76 HU, can be ascribed to growth of trees and shrubs on the riprap slopes and the habitat expansion zones, and the stimulus for aquatic habitat benefits which the mitigation features and plans for maintenance of plant growth in a mosaic pattern and preservation of a pilot channel would confer.

The assumptions regarding growth of plants and value of the wetlands were deliberately conservative. Conversely, assumptions regarding the future conditions without construction of flood control were less restrictive. Together, these lead to projections of a period during which impacts exceed environmental returns from the project's features. Short-term impacts are projected to last 3 to 8 years, after which environmental returns permanently surpass impacts.

Table C-4. Long-term projections of ecological values for lower Mission Creek (habitat units). Numbers enclosed within brackets are the difference between projections for Alternative 12 and those for the future without construction of a flood control project.

	Future without project (HU)	Alternative 12 (HU)
aquatic habitat	0.66 HU	1.09 {0.432 HU}
stream bank habitat	0.47 HU	0.82 {0.35 HU}
Totals	1.13 HU	1.91 HU {0.78 HU}

3. ARITHMETIC OF HABITAT EVALUATION PROCEDURE

This methodological section of the revised HEP analysis presents the arithmetic used to give numerical evaluations for the aquatic and the stream bank habitats of Mission Creek. Briefly, the analysis figures ecological worth of any given location by equating the attributes which characterize that location with a habitat suitability index (a number ranging between 0 and 1.0), then multiplying that index by the location's measured area. The result gives a measure of the location's ecological value as a single derived number, expressed as a habitat unit. Simple equations combine habitat unit values and routine ecological concepts to describe in numerical means how the creek's environs are expected to change over the 50-year life span of this proposed flood control project.

3.1 Habitat Units

3.1.1 **Area –** As quantified by a modified HEP, the ecological quality of habitats depends on two independent descriptors which are determined systematically rather than by a random sampling technique, or a stratified random procedure as may appropriate to the circumstances. The areal extent where that habitat occurs constitutes one of them. The figures in this analysis are based on the ecological value of individual segments of Mission Creek, each 25 yards in length, and as wide as the existing stream channel (for aquatic habitat) or as wide as the limits of construction for evaluating stream bank habitat. These widths were determined from detailed engineering drawings of the entire project area. As it exists, Mission Creek is rather irregular in size: it ranges between about 18 to 30 feet wide for the creek bed, and about 30 to 55 feet wide for the combined width of both banks.

3.1.2. **Habitat suitability index –** The other descriptor quantifies habitat quality with an appropriate habitat suitability index (HSI). The nearer a site is judged to be to the stable successional community which would naturally exist (i.e. independently of any human influence), the higher its HSI value, up to a maximum of 1.0. In essence, HSIs reflect the degree to which biological communities exhibit both spatial complexity of physical features and ecological interactions among the species which occur there.

Undisturbed riparian growth, equivalent to an HSI = 1, would be evident as a contiguous canopy of large trees which span the creek completely, and with a contiguous understory layer of shrubby species, mostly perennials but with some annuals as well. Trees would be rooted in the streambed and substantial root masses would form a stable component of the creek. The habitat value contributed by solitary, large native trees along Lower Mission Creek is reflected in HSIs for bank vegetation. Their importance warrants an HSI = 0.5 for any segment of stream bank such trees influence. As vegetation becomes more rank and dominated by aggressive non-native species, and physically removed back up the banks and away from the streambed, the overall ecological value drops. Such segments of the banks are assigned a lower HSI (Table C-5).

Undisturbed creek channel, which would also be assigned an HSI value equal to 1, would offer a continuous assortment of pools, riffles, and turbulent runs as determined by natural topography, root complexes of large trees, bends and twists of the river channel, and localized erosion of fine sediments and deposition of coarser sands and gravels. The steady erosion of fine

sediments would reveal solid, rocky outcrops. Over time, current patterns would shift among the bigger rocks as the long-term equilibrium between deposition and erosion deepened short runs and filled others. To the extent the channel lacks for diversity of features, and especially where a concrete bottom exists, lower HSI values were assigned (Table C-5).

Table C-5. Ecological features used to quantify overall habitat quality of Lower Mission Creek. Habitat suitability indices (HSI) span a range within each category of habitat evaluation.

HSI	stream channel conditions	bank vegetation conditions
1	Undisturbed stream channel	Intact coastal stream riparian gallery
0.7 - 0.9	Soft bottom reverting by stream flow to natural topographic relief of scour pockets and rocky outcrops. Native trees beyond the sapling stage.	Nearly contiguous canopy without natural understory, or contiguous shrubby understory without canopy
0.5 - 0.7	Soft bottom, maintained irregularly and only as needed. Sufficient time between cleaning permits saplings of native trees to reach an inch in trunk diameter.	Isolated, large native trees
0.3 - 0.5	Soft bottom periodically scraped but retaining a few small relief features, natural or man-made. Herbaceous perennials beginning to regrow.	Contiguous, weedy and opportunistic understory
0.2 - 0.3	Predominantly soft bottom with early regrowth of aquatic plants following periodic mechanical scraping. If present, discontinuous concrete features undercut by currents may mimic natural pools.	Patches of weedy growth separated by hardened revetments
0.1 - 0.2	Mosaic bottom, partly concrete and partly natural, the latter very recently scraped flat and bare of nearly all plant growth.	Small and isolated patches and intervening voids
less than 0.1	Expansive and entire concrete bottom with accumulated sediments and urban refuse	Nearly solid bank revetments

3.1.3. **Habitat units from HSI and area** – When figuring HUs, it helps to use numbered subscripts, "s" (each number referring to a particular place along the creek), to keep track of individual values:

$$HU_s = HSI_s \times area_s \qquad [1].$$

This way records the ecological quality of individual segments of the creek, and can distinguish the amounts of each kind of habitat present at Mission Creek, aquatic and stream bank.

In total there are 65 segments, each 25 yards long, between Canon Perdido Street and the Cabrillo Boulevard bridge (counting the oxbow as well). Between Canon Perdido and Haley Streets (27 segments, each 25 yards long), the creek's invert will be 43 feet wide; 50 feet wide from Haley Street to Highway 101 (11 segments); and, 60 feet wide between Yanonali Street and Cabrillo Boulevard (15 individual segments 25 yards in length). Merely adding up the

individual HU_s values (arithmetically, the equivalent of adding the product of each sequential area times the appropriate habitat suitability index) gives a total value of ecological worth, HU_T, of any one of the three portions. For example, the 50 foot wide section has a total value in habitat units of the sum of each of the 11 segments:

$$HU_T = \sum_{s=1}^{s=11} HU_s = \Sigma(HSI_s \times area_s) \qquad [2].$$

3.2 **Existing Conditions along Mission Creek**

In an undisturbed riparian community, the bank vegetation and the stream through it share many inextricable linkages, at all levels of ecological process. However, Mission Creek's riparian attributes have waned so thoroughly that describing stream bank habitat apart from stream channel habitat more realistically captures the existing conditions. So, the quantitative evaluations which follow of conditions on the stream's banks have been separated from those attributable to stream channel features.

The prevailing conditions present in each successive 25-yard length, i.e., the HSI value which characterizes that particular length of Lower Mission Creek (Table C-6), were based on pedestrian surveys of the entire creek in September 1997, December 1997, and May 1999. A few examples help to characterize the creek. Each refers to the range of HSI values described in Table C-5. HSI values of stream banks are highest where a significant tree grows, e.g., a prominent and old sycamore tree on the right hand bank immediately downstream of the De la Guerra Bridge, HSI = 0.5. Segments choked by dense stands of giant reed have lower HSI values commensurate with poor habitat qualities, e.g., the left hand bank upstream from Gutierrez Street, HSI = 0.3. Stream bank HSI values are lowest where man-made structures prevent growth of any sizable plants, whether native or not. Such a barren stretch occurs on the left bank just where the oxbow begins at Gutierrez Street, HSI = 0.05. Ironically, undercut concrete footings poured at the toe of the banks create many of the notable pools along the channel, e.g., on the left hand side below Cota Street, HSI = 0.45. A segment of creek bottom lined by concrete, covered by a thin layer of sediments and nearly devoid of plant growth constitutes quite poor aquatic habitat, e.g. upstream of Gutierrez Street Bridge, HSI = 0.05.

Table C-6. Existing conditions of Mission Creek, described as habitat suitability index (HSI) for successive segments. Each segment spans 25 yards of stream channel or stream bank. Reaches of the creek are divided into three pieces: that which would be 43' wide, that to be 50' wide, and that which would be 60' wide at the completion of the project.

43' wide reach: Canon Perdido to Haley

Bridge	segment	left bank	right bank	stream channel
Canon Perdido	1	0.15	0.2	0.4
	2	0.05	0.25	0.5
	3	0	0.25	0.5
	4	0	0.3	0.35
	5	0	0.3	0.25
De la Guerra	6	0	0.5	0.2
	7	0.05	0.5	0.3
	8	0.1	0.25	0.35
	9	0.15	0.5	0.3
	10	0.05	0.3	0.35
	11	0.25	0.15	0.4
	12	0.3	0.1	0.2
Ortega	13	0.1	0.3	0.35
	14	0.5	0.25	0.4
	15	0.5	0.2	0.3
Bath St.	16	0	0	0.15
Bath St.	17	0.05	0.5	0.3
	18	0.05	0.25	0.3
	19	0.05	0	0.15
Cota St.	20	0.15	0.3	0.25
	21	0.15	0.3	0.45
	22	0.3	0.4	0.45
	23	0.3	0.3	0.3
	24	0.05	0.3	0.3
	25	0.05	0.3	0.25
	26	0.2	0.3	0.2
Haley Street	27	0	0	0.15
Habitat Units		0.08	0.17	0.40

50' wide reach: Haley to Highway 101

Bridge	segment	left bank	right bank	stream channel
Haley	28	0.05	0.2	0.2
	29	0.1	0.3	0.4
	30	0.05	0.3	0.4
	31	0.3	0.05	0.3
	32	0.3	0.05	0.2
	32	0.3	0.05	0.2
	34	0.3	0.05	0.2
Gutierrez	35	0.05	0.25	0.2
	36	0.05	0.25	0.45
	37	0.05	0.25	0.45
	38	0.5	0	0.1
Highway 101				
Habitat Units		0.06	0.05	0.13

60' wide reach: Yanonali to Cabrillo Boulevard

Bridge	segment	left bank	right bank	stream channel
Yanonali St.	51	0.3	0.05	0.05
	52	0.3	0.05	0.05
	53	0.2	0.05	0.05
	54	0.15	0.05	0.15
	55	0.15	0.05	0.2
	56	0.2	0.05	0.25
Mason St.	57	0	0.5	0.25
	58	0	0.5	0.3
	59	0	0.15	0.4
	60	0.15	0.1	0.5
	61	0.2	0.1	0.5
	62	0.2	0.1	0.5
State St.	63	0	0	0.4
	64	0.3	0.2	0.4
Cabrillo Blvd.	65	0.3	0	0.3
Habitat Units		0.07	0.05	0.20

limit of the project, Cabrillo Boulevard

Table C-6 summarizes HSIs assigned to stream banks and channel. Merely as a way to give a sense of locations, segments along the creek were numbered from Canon Perdido Street (segment 1) downstream, past successive bridges (also noted in the Table C-6), to the bridge on Cabrillo Boulevard (segment 65). Habitat units computed from these HSI values and the measured areas give a current description of ecological quality on Mission Creek: 0.48 HU of stream bank habitat, and 0.73 HU of aquatic habitat.

3.3 Projected HU values

Ecological quality along Mission Creek will surely change from year to year in response to many environmental conditions, both biological and urban. The value of HU_T [equation 2] determined one year for any given reach would most probably have changed by the next year. Those projections of future habitat value and the pattern they follow are used throughout this HEP analysis.

Merely to write out equations in a less cluttered way, the notation for total habitat units, HU_T, will be replaced by V, to stand for habitat value. Subscripts used here denote years: e. g. V_3 would mean the habitat value (in HUs) for some reach determined in the 3rd year. In a general way the subscripts keep track of values from year to year, so that V_i, V_{i+1}, and V_{i-1} would mean the current habitat value in any year (i), the value of the same reach one year later (i+1), and the reach's habitat value the year before (i-1), respectively.

All the projections of habitat value expected in the future make use of a conventional mathematical representation of ecological processes, particularly where those processes cause predictable changes to occur between one year and the next. That predictability essentially measures some pertinent rate of change that is related to environmental circumstances and the diverse ecological processes which make a location what it is. In words, if nothing has changed in the past year, then next year's value of ecological quality, $V_{(i+1)}$, must be the same as this year's; $V_{(i+1)} = V_i$. If ecological values change, then the impetus for that change can be represented as a rate, R. Even random fluctuations of habitat quality can be regarded as ecological impetus, or at least some part of it, and can be incorporated into rates of changes.

All the projections start with this ecological generalization — next year's value ($V_{(i+1)}$) ought to equal its value this year (V_i) multiplied by 1 plus the rate for this year (R_i) at which ecological process make habitat conditions evolve. As an equation:

$$V_{i+1} = V_i \times (1 + R_i) \qquad [3].$$

Expanding equation [3] slightly shows why:

$$V_{(i+1)} = V_i \times 1 + V_i \times R_i = V_i + V_i \times R_i \qquad [3.1].$$

In words, the current value is the same as last year's plus the amount of change which occurred during the year, where multiplying the rate at which conditions changes times last year's value gives the amount of change from one year to the next.

3.3.1. Aquatic habitat

Future without Project: The equations which project habitat values expected in the absence of this proposed flood control project rest on three explicit assumptions about the creek bottom and adjacent banks. These assumptions have been fashioned directly into the rate term (R):

1. Climatic patterns which drive sediment aggradation will necessitate channel maintenance about every three years, on average. The equations treat this periodic, but unpredictable necessity as random events (indicated by φ_1, the Greek letter phi).
2. When maintenance occurs, removal of sediments and plants growing in the streambed reduces the previous year's habitat value by an amount proportionate to the linear extent of required maintenance. The equations treat this devaluation effect as a random amount, of at least 10% or as much as 35%.
3. When no maintenance is required, natural processes will change the habitat quality from one year to the next. This is also a random effect (φ_2), which varies from -5% to 15%; i.e., ecological quality may be as great as 15% higher than it was the previous year or 5% less, or any amount in between.

The equations are merely variations of [3], but with the important distinction that the rate term , R, differs from year to year, as implicitly shown in equation [4] by virtue of [4.1] and [4.2] and controlled by the value of φ_1. A random number generator assigns a value to φ_1 for each year, either 1, 2, or 3. In the random years when maintenance does not occur ($\varphi_1 \neq 3$), then R acquires (for a single year) a random value between -0.05 and 0.15, equation [4.1]. The need for channel maintenance ($\varphi = 3$) makes R take on a negative random value between -0.35 and -0.1 [4.2], which reflects the transient loss of habitat quality when plants and sediments are removed.

$$V_{(i+1)} = V_i \times (1 + V_i \times R_i), \text{ where} \qquad [4]$$

$$R_i \leftarrow (\varphi_1 < 3)[-5\% < \varphi_2 < 15\% \text{ , or} \qquad [4.1]$$

$$R_i \leftarrow (\varphi_1 = 3)[-35\% < \varphi_2 < -10\% \qquad [4.2].$$

Habitat values were computed separately for each reach of the creek. Initial values, V_0, used in calculations [4] were the total of HU for all 25-yard long segments within each of the three sections, to be 43, 50, or 60 feet wide, as given in Table C-6. Projections span a 50 year period, the lifetime of the project.

Equation 4.2 pertains to both the 43 foot wide and the 50 foot reaches of Mission Creek where periodic maintenance would be required even in the absence of the proposed project. The estuary portion (60 feet in streambed width) has not required removal of sediments historically and none should be necessary in the future, hence [4.2] never determines the value of R for use in [4].

Future with Alternative 12: Mitigation features which are explicit components of Alternative 12 have been treated as making separate and incremental additions to the HSI for any given segment of the finished creek bed. While calculations of ecological value were made by multiplying HSIs times the area of each segment, as given by [1], often it is easier to speak about their influence simply as a change to overall HSI for any given segment.

A general equation homologous to [4] gave projections of instream ecological quality following construction of the project:

$$V_{(i+1)} = V_i \times (1 + (r_{1(i)} + r_{2(i)} + r_{3(i)})) \qquad [5].$$

Here however, three separate terms replace the single rate term (R_i) seen before. Each one refers to distinct influences on the creek's habitat quality. The first, $r_{1(i)}$, accounts for natural processes which would cause the streambed to evolve after construction of the flood control channel and structural mitigation features that would become part of that channel. The effects of periodic maintenance become expressed through $r_{2(i)}$. Shade cast by trees, shrubs, buildings, and walls influence habitat quality through the term $r_{3(i)}$.

$r_{1(i)}$ » natural habitat quality progression: As was the case fore the future without project, equation [4], initial values of habitat quality, V_0, must also be determined for numerical projections of Alternative 12. Starting with each 25-yard segment, these equal the sum of HSIs accorded to each kind of mitigation features to be present in each segment, then multiplied by the appropriate area to habitat units. Adding all the habitat units within each of the three reaches, equation [2], gives initial values of habitat quality, V_0:

Canon Perdido Street to Haley Street (43' wide)	$V_0 = 0.328$
Haley Street to the freeway (50' wide)	$V_0 = 0.166$
Yanonali Street to Cabrillo Boulevard (60'wide)	$V_0 = 0.181$

In a mechanical sense, these embody the incremental components of aquatic habitat quality that trace directly to fish ledges, boulder clusters, permanent pilot channel, and so forth. Natural processes which currently impart habitat value to each reach of the creek (Tables C-5 and C-6), the initial values used in equation [4], would also influence the creek after the mitigation features have been built. Overall ecological quality would begin to increase starting from the initial values attributable to structural mitigation elements in each segment of the creek.

The pace at which innate tendencies toward greater habitat quality occurs was analyzed using <u>existing</u> habitat suitability indices for each segment on the rationale that current habitat quality would recur in due time if the streambed were simply made wider, 43 feet, 50 feet, or 60 feet respectively. Multiplication of existing HSI values times the respective design widths of the streambed gives a potential ecological value for each 25-yard segment. Adding all those potential values within each segment gives each of the three reaches an overall potential ecological value, denoted as V_p. It gives a value of what would be expected to happen in a wider stream channel but treated exactly as the creek has been to date. Using V_p in conjunction the habitat quality due to mitigation features, $V_{(i)}$, leads to the arithmetic form of calculating this part of the entire rate term:

$$r_{1(i+1)} = \left(\frac{V_p - V_{1(i)}}{V_p}\right) + \varphi_1 \qquad [5.1].$$

The random term, φ_1, accounts for chance fluctuations in the rate of natural processes. It ranges between -15% to 15%, and like the previous random terms can be any value within those limits.

$r_{2(I)}$ » maintenance of design capacity: A second part of the rate accounts for the ecological effect of maintenance, as required to prevent reduction of conveyance capacity in the creek. It is analogous to the arithmetic procedure for future conditions without a flood control channel, equations [4.1 and 4.2]:

$$r_{2(i+1)} \leftarrow (\varphi_2 < 3)[-\frac{r_{2(i)}}{2} \quad or \qquad [5.2]$$

$$r_{2(i+1)} \leftarrow (\varphi_2 = 3)[-r_{2(i)} \qquad [5.3].$$

In words, during the years when sediment removal is not required, the plant growth on half of the streambed will mowed or pruned to thwart the maturation of large perennials in the creek. This would reduce by 50% the increased ecological value attributable to plants rooted in the creek [5.2]. One year out of three on average (φ_2=3) the County would need to remove sediments and plants. This would undue completely the increased ecological value, a reduction by 100% [5.3]. When that happens the streambed would revert to the ecological values imparted by the structural mitigation features themselves, plus the value associated with whatever amount of shading has developed.

$r_{3(I)}$ » shading from riprap slopes: The value to creek bed habitat of shade cast by willows and large trees to be planted along the banks was based on results of the Shading Analysis (how to include that report ??). At the most, full shade at noon in mid-summer covering any one segment of the streambed would increase by 0.075 the HSI of that 25-yard long portion of the creek (equivalent to an additional 0.0056 HU where the creek would be 43 feet wide).

The arithmetic must first account for the extent to which shading would increase over time as shrubs and trees grow. When first planted, they cast no shade at all, so HSIs would start from a negligibly small value. This part of the calculations was made according to this equation, where S represents the HSI attributable to shading:

$$S_{(i+1)} = S_{(i)} \times (1 + (\frac{0.075 - S_{(i)}}{0.075})) \qquad [5.5].$$

In words, the farther from the maximum (HSI = 0.075) the extent of shade over any one segment of the creek happens to be because the plants are young and small, the faster the shrubs and trees are growing at the time. Early in their life willows and trees would get larger faster, so the faster the level of shading increases from one year to the next. It begins to slow as plants get sufficiently large that they already give an appreciable amount of shade. About 8 years would elapse before the HSI reaches its potential maximum, as shown by Fig. C-3

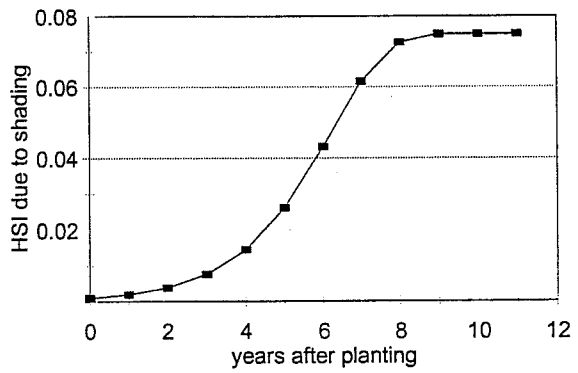


Fig. C-3. Pattern of increasing habitat suitability index as plants grow larger and thereby cast more shade.

The essential form of [5.5] reappears in the actual calculations of ecological value for each of the three reaches. Calculations of increasing shade used the same form of equation as others which represent naturally occurring changes, this time figuring the rate of change R as shown by the inner set of parentheses:

$$r_{3(i+1)} = r_{3(i)} \times \left(1 + \left(\frac{0.075 - r_{3(i)}}{0.075}\right) - \varphi_3\right) \qquad [5.6].$$

The random term, φ_3, accounts for loss of shade from one year to the next caused by dead or damaged trees. It was greatest during the first year (up to 60% loss of existing shade), as much as 35% loss the second year, 25% the third, 15% during the fourth year, 10% loss in the fifth year, and thereafter stayed constant at potential loss of 5% of the previous year's extent of shade.

4.3.2 Stream Bank Habitat

The calculations which follow lead to habitat units, HU, and these are always the product of area times habitat suitability index; HU = area × HSI, equation [1]. Here also, the substitution of V_i for HU_t makes the written form of equations less cumbersome. All calculations make quite conservative assumptions about the growth of native plants intended as part of the design for flood control on Mission Creek.

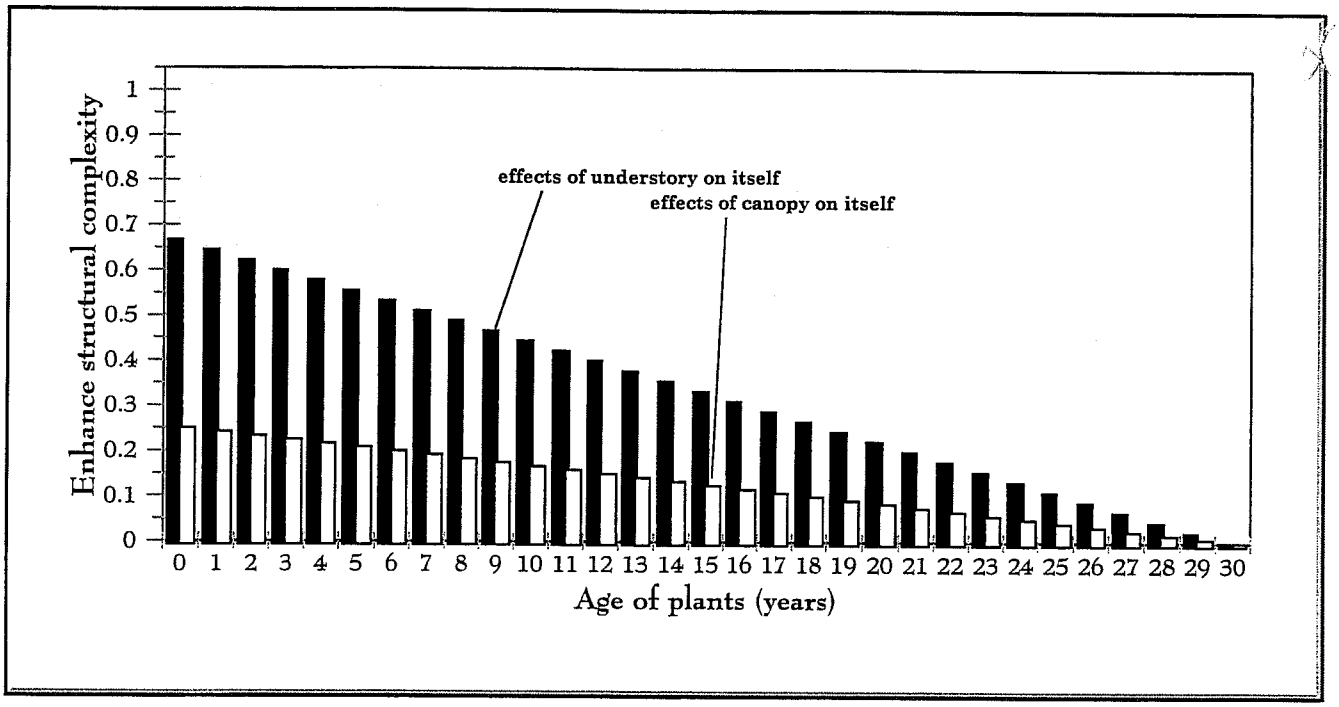
Computations of HSIs follow three sequential steps. The first yields two enhancement factors, one pertinent to species which compose the understory layer (EU) and the other to canopy species (EC). EU and EC are distinct from each other. The second step uses the value of those enhancement factors together with a "regional factor" (RF) for growth rate that reflects the influence of climate, soil quality, and water availability on growth and proliferation of riparian species. This step leads to an intermediate value, quality of the understory (QU_i) and quality of

the canopy (QC_i), respectively. In the third step, those intermediate values are used to compute a habitat suitability index for the current year.

(1) Enhancement factors — Computations start by representing these native species' innate successional tendency to enhance structural complexity from one year to the next as plants grow taller, expand laterally, and root structures become well established. Two pairs of functions (Fig. C-4) show the relative values by which structural complexity enhancement (denoted as S) are projected to occur in planted areas of Mission Creek. The notation is meant to separate effects of understory plant species on themselves as a group (S_{uu}), canopy species directly on themselves (S_{cc}), understory plants on canopy species (S_{uc}), and canopy species on understory (S_{cu}). Both S_{uu} and S_{cc} are inversely related to age of plants. Understory species ought to grow much faster than canopy species and thus would have a disproportionate influence in the first 10 years or so after plantings have been completed. The pair of equations in this first step shows how the interactions between understory and canopy species were described algebraically to figure successive enhancement factors, EU for understory and EC for canopy respectively, for this analysis:

$$EU = S_{uu} + S_{cu} \quad [6a]$$

$$EC = S_{cc} + S_{uc} \quad [6b].$$



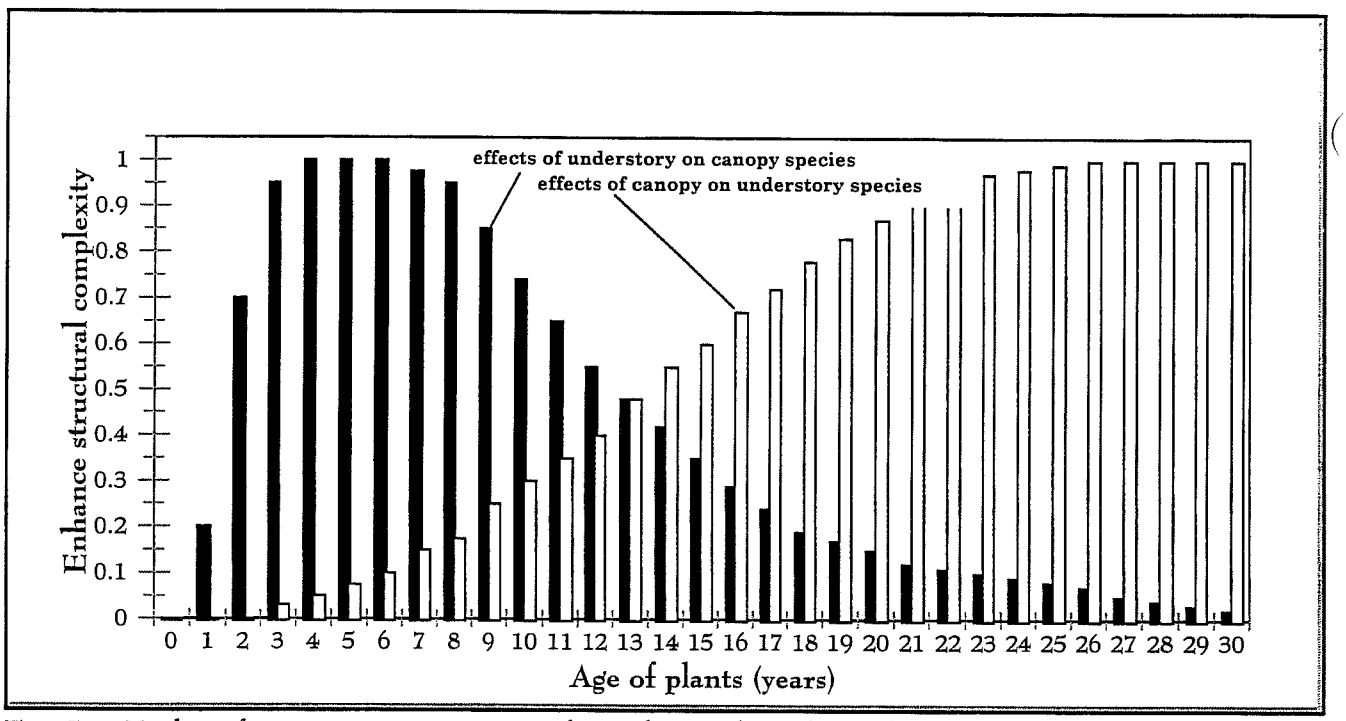


Fig. C-4. Tendency for native riparian species to enhance the spatial complexity of riparian habitat. Upper graph models effects of understory species on themselves (solid bars) and canopy forming species on themselves (open bars). Lower graph models understory species effects on canopy (solid bars) and canopy species on understory plants.

For these projections, the product of last year's enhancement factor times the regional growth factor become the measure of rate of increase in ecological quality. The second

equations pair uses this recurrence arrangement. Computations began with values for understory and canopy value commensurate with the expected conditions of riprap banks newly planted in native vegetation, and equal to each other; $QU_0 = QC_0 = 0.15$ (again, subscripts equal to zero merely refer to the beginning). They assume a regional factor of 7%; RF = 0.07:

$$QU_{(i+1)} = QU_i \times (1 + (RF \times EU_i)) \qquad [7a]$$

$$QC_{(i+1)} = QC_i \times (1 + (RF \times EC_i)) \qquad [7b].$$

(3) Projections of habitat suitability indices — The third step figures a habitat suitability index for each year from the intermediate quality values. It also makes use of a 'logisitical' term in the calculations, which treats the difference between a maximum HSI for the region and last year's projection as a proportion of that maximum: ($HSI_{max} = 0.80$). Projections of HSI for a particular year come by multiplying the square root of the product of the two quality values by that logistical term, then multiplying that result by a random term (φ_i). The vagaries of climate from one year to the next are accounted for by that random term, which can take any value between 0.7 and 1.3. When $\varphi_i < 1$, HSIs would turn out smaller than predicted and reflect adverse growing conditions. If greater than 1, habitat suitability would be higher for a given year than predicted by equation [6a, 6b] and [7a, 7b] alone.

$$HSI_{(i+1)} = \varphi_i \times \left(\frac{HSI_{max} - HSI_i}{HSI_{max}}\right) \times \sqrt{QU_i \times QC_i} \qquad [8].$$

APPENDIX - D

REVISED
COASTAL CONSISTENCY DETERMINATION (CCD)

LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

SEPTEMBER 2000

COASTAL CONSISTENCY DETERMINATION
FOR
LOWER MISSION CREEK FLOOD CONTROL PROJECT
IN SANTA BARBARA,
SANTA BARBARA COUNTY, CALIFORNIA

The following Coastal Consistency Determination (CCD) is prepared in compliance with the Federal Coastal Zone Management Act of 1972, Section 307 (Title 16, USC Section 1456 (c)), which states that federal actions must be consistent with approved state coastal management programs to the maximum extent practicable.

R In December 1999, the U.S. Army Corps of Engineers (USACOE) submitted a Coastal Consistency Determination (CCD) to the California Coastal Commission (CCC), in satisfaction of CZMA requirements (Section 106(d)) to certify consistency to the maximum extent practicable with an approved State Coastal Zone Management Plan. The proposed project is partially within and will have an effect on the coastal zone, as established by the California Coastal Act of 1976. Mr. James Raives of the California Coastal Commission (CCC) has determined that a CCD will be required for the Lower Mission Creek Flood Control Project.

R The USACOE submitted the CCD on December 20, 1999 to the CCC with the Draft EIS/EIR.. Since submittal of the CCD, extensive formal and informal coordination has occurred between USACOE, the City of Santa Barbara and the CCC staff. The CCC requested additional information to evaluate the proposed project for consistency with the habitat, water quality, sand supply, visual and archaeological policies of the Coastal Act (see Section 1.7 of the EIS/EIR for details on coordination). In addition, the CCC felt that completion of formal Section 7 consultation (as required by the Endangered Species Act), including final biological opinions, is essential in preparation of a staff report and recommendation on the proposed project. The USACOE provided additional available information via e-mail and by letter, dated June 21, 2000. The biological opinions were not included in that package. Therefore, the USACOE requested postponement of the public hearing on the CCD until February 2001 or until the biological opinion is received from the US Fish and Wildlife Service (USFWS). The USACOE has revised the CCD to incorporate revised project design, mitigation measures and coordination/input received from the CCC staff. The USACOE will submit this revised CCD to CCC for their approval.

The City of Santa Barbara provided a letter (February 22, 2000) to respond to some of CCC staff's concerns on construction of vertical walls between Yanonali and State Streets and aesthetics in the coastal zone. The City identified the possibility of using Redevelopment Agency Funds to improve aesthetic resources of the coastal zone within the project area.

BACKGROUND INFORMATION:

The US Army Corps of Engineers (USACOE) conducted a feasibility level study, in cooperation with the Santa Barbara County Flood Control District (SBCFCD) and the City of Santa Barbara, of the flooding problem along Lower Mission Creek, Santa Barbara, California. The City of Santa Barbara has an inter-governmental agreement with the SBCFCD to share the non-federal cost of the study and to act as lead agency under CEQA. The proposed project is authorized by Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), approved October 23, 1962. The study identifies, describes, and evaluates feasible plans and fully develops the recommended plan to be submitted to Congress for project authorization. At the request of the Local Sponsor, the study area has been limited to the downstream 1.2 miles of creek reaches. The study includes the area just downstream of Canon Perdido Street to the Cabrillo Boulevard Bridge. The 1995 USACOE Feasibility Study revealed that sediment detention measures are not economically feasible. Given that economics were infeasibility and considering local opposition to any form of sediment detention, no detention basin is being considered in this study. The scope of investigation has been further limited to the evaluation of a locally developed alternative, as well as any new alternatives not previously analyzed by the USACOE. The study also includes opportunity to increase ecological values.

PROJECT PURPOSE:

The primary purpose of the proposed project is to reduce flooding damages to residential and commercial properties in the floodplain (See Section 2 of the Main Report). The project will provide 20-year flood protection to the City of Santa Barbara. Any proposed alternative along Lower Mission Creek would necessarily require future maintenance including sediment and debris removal to maintain creek storage and flood flow capacity during storm seasons. Without any maintenance, the City and surrounding areas would be frequently inundated by flooding, with risks to life and property. Therefore, even the without project condition plan assumes ongoing maintenance of the channel through sediment removal. Future maintenance is a part of the project design; impact analysis and mitigation measures are included for future maintenance in the Final EIS/EIR.

PROJECT DESCRIPTION:

The proposed project improvement would be carried out along Lower Mission Creek, Santa Barbara, California. The study is limited to the downstream 1.2 miles of the creek, from just downstream of Canon Perdido Street to Cabrillo Boulevard (see figure 1).

R Since release of the Draft EIS/EIR, the project description and future maintenance have been revised based on hydraulic/engineering, real estate constraints, and comments received from the resource agencies to include structural features to mitigate or minimize impacts to the biological resources, particularly to the Federally listed species, steelhead and gobies. Future maintenance of the constructed channel and culvert and weir length and height has been modified based on additional Hydraulic Analysis performed for the Recommended Plan. A detailed project description can be found in Enclosure 1.

R Alternative No. 12 is the recommended plan and consists of: improvements to the channel for approximately the last mile of the creek between the Canon Perdido Street Bridge at the upstream end, and the Cabrillo Boulevard Bridge near the outlet; replacement of four bridges, streamlining bedslope, installing a culvert that bypasses the oxbow, stabilizing creek banks using vertical walls and riprap sideslope; and planting of native vegetation along the riprap. The creek width would range from 60 to 70 feet at the top. The specific width of the channel at each bridge crossing is listed in Chapter 4, Plan Formulation, of the Main Report. The average depth of the creek would be 8 to 12 feet throughout the project reach. Future maintenance for the life of the project is included in the project description. Future maintenance of the constructed channel is essential to retain the form and design capacity of the creek. Impacts related to future maintenance are addressed in the document. Chapters 6 through 19 of the EIS/EIR provide existing conditions and address impacts related to this proposed project. Environmental commitments and mitigation measures are included to avoid/reduce or minimize impacts to natural and cultural resources [Environmental Commitments/mitigation and Mitigation Monitoring Plan, Enclosure 2). The Biological Assessments prepared for two Federally listed species, steelhead and tidewater goby, identify existing conditions, impacts to these species due to implementation of the project construction and future maintenance (Enclosure 3). The USACOE has received a Biological Opinion for steelhead (Enclosure 4) from the National Marine Fisheries Service.

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of flood protection. The existing natural bottom would be maintained; natural bottom would be reestablished in some areas where there is a hard bottom, and creek banks would consist of a combination vertical wall and ungrouted riprap. The bottom half of the bank would consist of a vertical wall while the upper half would be built with riprap at a 1.5:1 (H:V) slope. Aesthetic treatment would be incorporated into the project design to minimize the visual impacts of vertical walls. The riprap would be covered with topsoil. Concrete pipes of varying sizes (up to a maximum of three feet in diameter) extending through the riprap layer to underlying soils would be strategically placed to allow planting of native trees and vegetation. Native willows or branches and other native herbaceous plants would be planted beneath the riprap and would sprout through gaps in it to form continuous understory riparian growth.

Upstream of Highway 101, the combination of vertical wall and riprap would be the predominant bank treatment, except in two short reaches just upstream of the Haley/De la Vina and De la Guerra Bridges. Below Highway 101, the combination of vertical wall and riprap would be applied along the southeast bank, starting from midway between the Chapala and Mason Street Bridges to the State Street Bridge. Vertical walls would be maintained for the remainder of this reach.

The improved creek would generally follow the existing alignment and would incorporate a new culvert between Highway 101 and Chapala Street Bridge that would bypass the oxbow. The oxbow would be left in place to function as the low flow channel.

Five small parcels of open land would be left along the banks after completion of project construction. These parcels range in size between 0.03 and 0.14 acres (Fig. 3.5.4). These parcels would be used to expand the area planted in creek bank vegetation, so called "habitat expansion zones." Each habitat expansion zone would be designed to serve a dual purpose: to expand the corridor of riparian habitat to be planted along the stream banks and to provide for passive park space for area residents. Native trees, primarily western sycamores, cottonwoods, and coast live oak,

from local nursery stock would be planted in the habitat expansion zones. In time, their canopies would form dense clusters on the overbank and adjacent to the stream corridor. In some of these zones, pathways and benches might also be added to create passive park spaces.

Planting along the riprap and planting of native trees and other plants in habitat expansion zones are an integral part of the project design. The ecological values generated by these features will offset the impacts from the implementation of the proposed alternative on existing stream bank vegetation. Therefore, no mitigation will be required for the temporary loss of habitat along the stream banks. This proposed alternative provides maximum habitat values compared to all other alternatives evaluated in this document. In the long-term, the habitat value within the project reach would exceed the value of the existing habitat.

If any of the planting on the aforementioned features is deleted from the project design, then impacts related to the bank vegetation would need to be recalculated, which could result in additional mitigation.

Removal of Existing Bank Protection and Earthen Material:

The creek bottom and banks for about a mile, between the Canon Perdido Street and Cabrillo Boulevard Bridges, would be excavated to increase the creek capacity to provide a 20-year level of flood protection to the City of Santa Barbara. The removal of all existing banks would occur within the project reach except for a retaining wall located just upstream of De la Guerra Street Bridge and both banks along the oxbow between Highway 101 and the Chapala Street Bridge. The excavation of the channel would begin from the downstream end of the project near Cabrillo Boulevard and progress upstream. Where the riprap-vertical wall is used, the height of the wall would be approximately half the depth of the creek. The riprap sideslope would be built at a 1.5:1.0 slope. Concrete pipes of varying sizes, placed vertically in between the riprap, would serve as openings for planting of native riparian vegetation. The riprap sideslope would be covered with topsoil and planted with ground cover and shrubs that would help develop the understory of the larger riparian canopy along the creek.

R The excavated material could be distributed to other construction sites requiring fill. All of the sandstone not used in project construction will either be conserved for use in other City projects or, if badly damaged, recycled. Most of the metal and concrete can be recycled. The green waste can be recycled as compost and mulch. The USACOE will examine the suitability of the excavated material for beach nourishment. If material is suitable, it can be used to restore sand supply on local beaches. The existing creek banks would either be replaced with the combination short walls and riprap sideslopes or vertical walls.

R **Weir Inlet and Culvert that Bypasses the Oxbow:**

The culvert (two 15-foot wide by 6-foot high boxes) connecting both ends of the oxbow is referred to as the overflow culvert or the "oxbow bypass." The overflow culvert would follow a more direct path across the oxbow. It would begin upstream of Highway 101, pass under the highway (where Caltrans has built a span to accommodate such a crossing to eliminate impacts to highway traffic), under Montecito Street, and under the railroad tracks before rejoining the creek alongside the downstream end of Chapala Street Bridge (See Figure 3.5.2.1-3 of Enclosure 1).

A weir structure (see Figure 3.5.2.1-4, Enclosure 1) would be built at the inlet of the culvert to control the flows through the culvert and the oxbow. The height of the weir would be set in order to direct lower flows of up to 640 cfs through the oxbow. Also, the weir would split higher flows (up to the design conveyance capacity of 3400cfs) between the culvert and the oxbow. The culvert divider would be designed to form a "bullnose" and help minimize the potential of debris blockage. Refer to Exhibits in the Main Report for the details of these design elements.

Removal and Replacement of Bridges:

Twelve bridges span Lower Mission Creek before emptying in to the Pacific Ocean. Four of those bridges would need to be replaced including Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges. The De la Vina Street Bridge will be replaced by the city prior to implementation of this project. It is expected that the sequence of the remaining bridge demolition and reconstruction would complement the creek improvement construction schedule. Construction of the bridge replacements at the road crossings would need to be phased so that the adjacent road crossing could be used as a detour. Bridge reconstruction would start with the most downstream bridge (Mason Street Bridge) and progress sequentially in the upstream direction ahead of the creek improvements. This would enable flood control benefits to be realized for the area downstream of the improved creek during the construction phase. (See Section 3.5.2 of Enclosure 1 for details.)

R **Pilot Channel:**

The project's design for the creek's invert includes scoring a "pilot channel" into the bottom as the last element of construction. Otherwise, the streambed would be a uniformly flat expanse of native sediments between the toe walls. This pilot channel would constitute a permanent component of the instream habitat between Canon Perdido and Highway 101, although one possibly given to positional shifts as the finished creek bed evolves. No pilot channel would be fashioned into the creek bed below Yanonali Street. Between Yanonali and Mason Streets, periodic tidal ebb and flow would largely negate the intended purpose of such a channel, and, below Mason Street, the tidal movements would very quickly make it thoroughly ineffective.

A pilot channel large enough to carry at least 50 ft^3/sec would be adequate to carry water along the preferential natural course. Its physical size and shape would also be determined after final hydraulic analyses, but would probably be generally trapezoidal in appearance and 10 to 12 feet wide and about 1 foot deep. The channel would be enriched with representative types and gradations of the larger native substrates - coarse gravels, small cobbles, and rocks or boulders as currently exist within Mission Creek.

R **Structural Features to Mitigate and Avoid Impacts to Biological Resources:**

Several structural features would be included to avoid and mitigate impacts to biological resources. These permanent and durable mitigation features would create hiding places where fish may take refuge. They would be composed of four separate structural elements formed by coarse surface relief of the walls (goby refugia), artificial overhangs projecting from the walls (fish ledges), placing double rows of coarse boulders (fish baffles) between the overhangs along the creek walls (See Figure 3.5.2.1-18, Enclosure 1) and rock energy dissipaters. In combination, they should

provide shelter for fish of all sizes. See Section 3.5 of Enclosure 1 for the detailed description of these features, and the Biological Assessments, which include the purpose, implementation and mitigation provided by these features.

Material Required for Construction:

Material required for project construction includes: earth-fill material; concrete for walls, footings, and the box culvert; rocks/riprap for slope protection; steel reinforcement for concrete support; filter material; fencing material; top soils; planters; and material required to establish vegetation. Most of the material would be obtained from a distance of about 5 to 10 miles radius from the project area.

Duration of Construction:

Project construction, including the proposed creek improvements, oxbow culvert, and bridge replacements, is expected to take a minimum of two years to complete. During construction, excavation activities would not be carried out during heavy rain and the flooding season. Every effort would be made to complete the project construction within two years. However, due to weather conditions/seasonal heavy rainfall, mechanical failure, or funding constraints, the project construction could be delayed. In that case, project construction could take up to three or four years to complete. Project construction is scheduled to begin in mid-2003. The construction start date is dependent upon finalization of the EIS/EIR, compliance with all environmental regulations, and availability of the necessary funding.

R Project construction would not occur within flowing water between December 1st and March 30th to avoid potential impacts to adult steelhead, a Federally listed species. Between April and the end of May, a biologist would monitor select locations upstream for the presence of young steelhead preparing to swim down to the ocean. Either the USACOE or an environmental contractor would fulfill this monitoring commitment. Temporary, brief suspensions of construction could occur during these two months.

Staging / Stockpiling Areas:

The proposed staging area would be located north of Highway 101 adjacent to the channel with access off of De la Vina Street. This area could also be used for construction access. Another possible staging area would be located north of the channel between the railroad and Yanonali Street. At this staging area, the selected contractor would install a temporary trailer with sanitary facilities. Small quantities of material excavated (about 3000 to 4000 cy) from the creekbed would be stockpiled at these local staging areas, but the majority of it would be transported to the remote stockpile/disposal site, about 10 to 25 miles from the project area. Material would be processed on site to be used for the project construction. The USACOE will examine suitability of the excavated material for beach nourishment. If material is suitable, it can be used to restore sand supply on local beaches. Suitable material, about 18,000 cy, would be utilized in the project construction. Additional access points could be at State Street, Mason Street, Montecito Street, Cota Street, Bath Street, Ortega Street, and north of De la Guerra Street.

Equipment for Excavating Creek and Establishing Creek banks.

Construction equipment required for excavation of the creek and stabilization of the creek bank would likely include two graders, three dozers, four bucket excavators, two loaders, one water truck, and dump trucks. Future maintenance would require two excavators and about 4 to 8 truck trips per day to transport the sediment.

R **Future Operation and Maintenance:**

Future maintenance of the creek is an integral part of the Recommended Alternative (Alternative 12). To ensure and maintain its design function and form, some upkeep to maintain the design capacity of the channel would be needed on a regular basis. Any areas where sediment deposition and/or vegetation growth occur beyond 15% of the channel capacity would be required to be removed to maintain the capacity of the project reach. Future maintenance would also include maintenance of the structures such as cleaning of oxbow culverts, pilot channel, repair of vertical concrete walls and riprap (bottom riprap lining and baffle piers), structures for mitigation, and maintenance of planted vegetation (after initial establishment required as part of project construction). It is estimated that the frequency of sediment removal would be at intervals as often as once a year. However, when several low-flow years occur sequentially, sediment removal might occur every two to three or more years. Floodflows and debris accumulation and removal would continue to impact channel vegetation and aquatic resources. Over time, pools and riffles that provide aquatic habitat would reestablish in the channel (See Enclosure 1 for details).

Impact analysis for future maintenance is included in each resource discussed in the EIS/EIR. Impacts related to maintenance activities are addressed in Chapters 6 through 19. Mitigation measures for future operation and maintenance for the life of the project have been developed. Conditions identified in the EIS/EIR, Mitigation Monitoring Plan, Biological Opinion for steelhead and Biological Assessments would be followed during each operation and maintenance activity. A brief description of each activity is provided in the following paragraphs (see details in Enclosure 1).

Duration of Future Operation and Maintenance:

Usually, sediment removal would occur only when the flow of water approaches the seasonal minimum, i.e. between mid-August and mid-October. Maintenance would not occur between December and March to avoid impacts to steelhead and tidewater gobies, both Federally listed species. However, in the case of a heavy storm event, maintenance of the channel invert could be required between December and March. If maintenance work occurs during these months in flowing water, a qualified biologist would be on site to monitor the sediment removal activities. Environmental commitments identified in Sections 6 through 24 and Mitigation Monitoring Plan would be followed during future sediment removal operations. Future sediment removal activity may take about 15 to 30 days per year.

COORDINATION:

The USACOE has coordinated the proposed project extensively with the concerned resource agencies, including the U.S. Fish and Wildlife Service, National Marine Fisheries Service, California Department of Fish and Game, California Coastal Commission, and California Regional Water

Quality Control Board. A detailed coordination summary is located in Section 1.7 of the Final EIS/EIR. Documents submitted by the USACOE and received from the resource agencies are enclosed with this CCD for your information. The list of documents is provided below (details are provided in the enclosures):

The USACOE submitted revised Biological Assessments to both agencies, NMFS and USFWS, on June 16, 2000 and June 21, 2000, respectively.

On August 2, 2000, the NMFS provided a Final Biological Opinion for project construction and future maintenance.

The USFWS provided a Final Coordination Act Report on May 3, 2000.

The USACOE submitted a determination on the cultural resources to the State Historic Preservation Officer (SHPO) with the supporting documentation on June 27, 2000.

A response was received from SHPO on August 3, 2000, concurring with our determinations of eligibility and effect. The project as planned will have no adverse effect on properties that are eligible for inclusion or are included in the National Register of Historic Places. The project complies with Section 106. However, it should be noted that the project will have impacts on structures that are eligible for local designation and may be eligible for the California Register of Historic Places.

The USACOE has coordinated with the CCC staff since November 1999 to date. A summary of the coordination with the CCC is provided at the beginning of this CCD.

EXISTING SIGNIFICANT RESOURCES LOCATED WITHIN THE PROJECT AREA.

All environmental resources have been evaluated in the EIS/EIR; discussions of each resource are provided from Section 6 through 19. Evaluation of each resource revealed that the project area does contain significant biological and cultural resources. Therefore, these two resources have been described in the following paragraphs, along with water resources which have important policy considerations for the CCC. Each environmental resource has been analyzed in the Final EIS/EIR.

R **Biological Resources:** Two species of fish, both listed for Federal protection as endangered under the Endangered Species Act, make use of Mission Creek. The tidewater goby (*Eucyclogobius newberryi*) enters the creek from the coastal lagoon and forages as far upstream as the Chapala Street Bridge. At that point, a man-made sill about 15 inches high and spanning the entire channel probably blocks gobies from swimming into the lower end of the sandstone-walled channel in all but the high water events of the winter rainy season, a time of year when gobies would congregate much closer to salt water anyway. Tidewater gobies would be present in the area to be affected from late spring through the fall months. The second species, steelhead (*Oncorhynchus mykiss*), uses the lower end of Mission Creek as a migratory channel when flow conditions permit. Adults could swim upstream after steady winter rains have raised runoff rates. The species evidently spawns successfully in some years in the upper reaches of the watershed. Juvenile steelhead would use Mission Creek through the project area only as a migratory corridor to the ocean. Lower Mission Creek, the area within the project area, does not afford rearing conditions for steelhead.

Isolated native trees of notable age still occur at various locations along the creek. Of these, six are western sycamores (*Platanus racemosa*) and one is a coast live oak (*Quercus agrifolia*). Elsewhere along the creek, a young cottonwood (*Populus fremontii*) struggles to survive against the effects of periodic channel maintenance, and a few mature willows (*Salix lasiolepis*) and fewer still white alders (*Alnus rhombifolia*) have become established on the overbank. The large Moreton Bay Fig Tree (*Ficus macrophylla*), for which Santa Barbara is renowned, grows east of Mission Creek and at an elevation about 7 feet higher than the channel.

Water Resources:

Surface water quality in the upper canyon areas, above urban development, is generally considered very good. Water quality deteriorates, however, as Mission Creek flows through the city of Santa Barbara to the ocean. Surface water, which is typically present during the winter to spring wet season, consists of flows from the upper reaches of Mission Creek and Rattlesnake Creek, as well as stormwater runoff from the surrounding urban areas. The runoff from urban areas would be expected to be of poor water quality. Stormwater pollutant loading (i.e., the amount of pollutants washed off by stormwater runoff) are influenced by the area rainfall pattern, the total area of the drainage basin, and the distribution of different land-use types in the drainage basin (Woodward-Clyde Consultants, 1990). Contaminants which are likely to be of particular concern in urban runoff include oil and grease and inorganic pollutants, especially lead, zinc, and copper. Pathogens, total suspended solids and nutrients can also be a problem in urban runoff (see details in Section 7.1.1 of the Final EIS/EIR). Water quality within the project area has been degraded due to stormwater runoff and deposition of refuse within the creek bed.

Cultural Resources:

As planned, the preferred alternative is unlikely to adversely affect any prehistoric cultural resources. However, due to the close proximity to the ethnohistoric Chumash village of syxutun, the potential exists for discovering unknown archeological deposits during channel widening activities. The proposed alternative will impact 10 historic resources, none of which are eligible for inclusion in the National Register of Historic Places (NRHP). Some of the structures will need to be removed or partially removed to accommodate the widening of the channel. With the exception of the NRHP eligible Chapala Street Bridge, the other bridges in the APE are not eligible for NRHP listing.

In addition to the houses along the creek channel, five other historical entities are evaluated. These include the Potter Hotel footbridge, the Chapala Street Bridge, the Sandstone Diversion on the reach of Mission Creek between Montecito and Chapala Streets, the Hotel Californian Garage (15 West Mason Street), and the Moreton Bay Fig Tree. The Hotel Californian Garage will be removed to accommodate the proposed channel widening. All historic buildings and structures in the area of potential effects that may be affected by the proposed channel widening project are enumerated in Section 18.

ENVIRONMENTAL CONSEQUENCES OF THE PREFERRED ALTERNATIVE:

Biological Resources:

The preferred plan for bank stabilization, a riprap slope extending to the bank top from low channel walls, would allow planting of a narrow but viable corridor of native riparian vegetation. A canopy consisting of several species of native trees, and an understory layer consisting of willows and other native perennial species would be planted. Overall, habitat restoration of Lower Mission Creek would restore a significant wildlife corridor to this coastal stream.

Removal of concrete surfaces from many places along the creek and restoration of a natural bottom would enhance aquatic habitats along the creek. Placement of large boulders to dissipate stream flow energy would also promote stream conditions favorable to all fish and benthic organisms. Expansion of the creek channel below Yanonali Street would increase the habitat available to tidewater gobies. Various structural adaptations of the walls would mitigate for unavoidable, but not significant effects on gobies and steelhead. These features, and the maintenance techniques which have been developed, would yield an important measure of incidental ecological benefit.

R Construction of flood control structures along Mission Creek would cause significant, temporary impacts to the stream's bottom and thereby to the low-quality aquatic habitat which exists along the channel. Similarly, significant and temporary impacts would occur to coarse, weedy vegetation along the banks. Solitary, stately native trees would be removed in two locations to accomplish construction. Construction has the potential to damage small roots of the Moreton Bay Fig, but not the principal components of its root system. Construction would occur sufficiently far from it to avoid any direct impact to its buttress roots, trunk, or branches. The flood control structure should have no effect on subsurface water flow around the fig tree.

The project construction and future maintenance related impacts to two federally listed species are provided in the Biological Assessments (Enclosure 3). The USACOE has coordinated the proposed alternative with the USFWS, NMFS and CDFG. A modified Habitat Evaluation Procedure (HEP) was performed by the USACOE to quantify the quality of habitats located within the project area. Based on this evaluation, the project related impacts to the biological resources have been analyzed. See Enclosure 5 for details on HEP analysis. Two Biological Assessments have been prepared for the Federally endangered species located within the project area. One has been submitted to the USFWS, the other to the NMFS (Enclosure 3). The NMFS provided a Final Biological Opinion (Enclosure 4). The USFWS is analyzing the impacts of the project on tidewater gobies and is expected to transmit the Final Biological Opinion by early November 2000. The USFWS has provided their Final Coordination Act Report, which is also enclosed for your information (Enclosure 6). Conditions identified in the Biological Opinion would be followed during project construction and future maintenance.

Direct impacts to gobies would be minimized by slowly de-watering half the channel at a time to allow construction in dry conditions. This plan would entail enclosing half of the channel at its lower end with sheet piling, then trapping as many fish as possible and removing them to the other side of the piling. The process would be repeated for the other half of the channel. Impacts to steelhead would be avoided, or minimized, by scheduling construction in the channel and along the banks during the summer and fall months, when steelhead would not normally be present.

Water Resources:

Excavation of the existing creek bed and banks would result in short-term impacts to water quality; turbidity levels would increase due to channel removal. However, construction activity would occur during the non-flood season. Impacts would be short-term and localized. Turbidity levels would also increase during periodic future debris removal operations which could take from 8 to 10 days to accomplish. Impacts would be short-term and localized and would not exceed turbidity levels encountered under future without project conditions. Measures would be followed during both construction and future debris removal to minimize impacts from turbidity.

Improvement of Water Quality by Reducing Non-Point Discharge:

The CCC staff voiced concerns about water quality in the project area. In particular, non-point source discharges appear, to that agency, to degrade water quality of the creek. The CCC staff requested of the USACOE a full evaluation of practicable means to treat, reduce, or eliminate non-point source discharges as a design feature of the proposed project.

The project purpose is flood control, however, prior to project construction, the creekbed would be cleaned up, which includes removal of the urban refuse. The project design includes planting of vegetation along riprap slope and construction of habitat expansion zones. Planted vegetation may perform biofiltration functions. However, such contaminants must arise from the entire watershed. After completion of the project, access to the creek bottom would be limited due to newly constructed sideslopes. That will reduce the deposition of urban refuse. Indirectly, the proposed project will reduce the non-point discharge of urban refuse in the creek. The Santa Barbara County Flood Control District is a local sponsor for the proposed project, and the City of Santa Barbara is a responsible agency for compliance with the California Environmental Quality Act (CEQA). They are participating in this project. Therefore, the Corps of Engineers has coordinated with the City of Santa Barbara for improvement of existing water quality by decreasing non-point discharge.

City of Santa Barbara officials indicated that the City will be applying for a National Pollution Discharge Elimination System (NPDES), Phase II permit as part of the EPA's recently approved rules for the Clean Water Act. The permit will focus on reducing non-point source pollution. The City also has a Water Quality Improvement Project which is funded to do exactly as the title states, improve the water quality of the city's creeks and beaches. This effort includes many of the Best Management Practices (BMPs) required for a NPDES permit such as public education/outreach, public participation, illicit discharge detection/inspection, construction site runoff inspection/control, and good housekeeping for municipal operations. Also included as part of the funded project are funds for capital improvements that could include devices (special outlet filters) to separate trash from storm water runoff. There are storm drain outlet locations on lower Mission Creek where these devices could be installed in the future (see Enclosure 7).

By implementation of the above permit programs, there would be a reduction in the non-point source discharges in Lower Mission Creek.

Cultural Resources:

Alternatives 6, 8, and 12 have the potential to require removal of a number of historic structures. The City of Santa Barbara awarded a contract to conduct an updated architectural survey of the affected environment in the area of potential effects (APE). The survey, completed in November 1999, recommended buildings and structures which should be determined eligible for the National Register, the California Register or local listing. There are potential adverse effects under the National Historic Preservation Act for Alternatives 6 and 8. There are none for Alternative 12. Mitigation of adversely affected historic properties under Alternatives 6 and 8, may consist of historic recordation of the locally significant historic properties, and possible relocation of important houses. Archeological and Native American monitors will be on-site during all ground disturbing activities to ensure that if any Native American materials or deposits are discovered, the Corps of Engineers and the City of Santa Barbara will be notified immediately. The USACOE submitted a letter to the State Historic Preservation Officer (SHPO) with the supporting documentation. A response was received from SHPO on August 3, 2000, concurring with our determinations of eligibility and effect (Enclosure 8). The project as planned will have no adverse effect on properties that are eligible for inclusion or, are included in the National Register of Historic Places. The project complies with Section 106. However, there will be significant unavoidable impacts on 15 West Mason Street, a City Structure of Merit. Project redesign has occurred to protect other properties that may be eligible for City or State designation or listing.

Article 1, General, Section 30400 to 30404.

The purpose and scope of this EIS/EIR and Feasibility Study is to: (1) define the flood problems in the Lower Mission Creek Drainage area in Santa Barbara; (2) identify potential solutions; (3) develop a preferred plan and viable alternatives; (4) evaluate environmental impacts for the preferred plan and viable alternatives; (5) incorporate the City of Santa Barbara General Plan and Local Coastal Plan Goals and Policies for each environmental resource in evaluating each alternative including the preferred plan; and (6) develop possible mitigation measures to offset project related impacts. The proposed flood control alternatives for Lower Mission Creek will contribute to national economic development by reducing the flood losses in the area and protecting the nation's environment. Guidance for this purpose is specified in ER 1105-2-100, Guidance for Conducting Civil Works Planning Studies. The EIS/EIR is prepared in compliance with the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA) and other Federal, State and Local environmental regulations. Mitigation measures have been identified to minimize impacts to water resources by implementation of the proposed project.

The tentatively recommended plan provides maximum environmental benefit compared to any other alternatives. The project faces serious constraints for right-of-way because the project is located within a densely populated area of the City of Santa Barbara. As indicated in a letter from the City of Santa Barbara (Enclosure 7), land costs are extremely high in the City. Implementation of the proposed project would improve the existing aesthetic conditions and would increase opportunity for the recreational activities.

Article 2, Public Access, Sections 30210 - 30214.

The proposed project ends at Cabrillo Boulevard Bridge; it does not extend to the beach area of the City of Santa Barbara. Therefore, implementation of the proposed project would not result in interruption to public access in the coastal area. However, within the project limits from Canon Perdido Street to the Cabrillo Boulevard Bridge, the proposed project construction would temporarily affect the operation of roadways in the immediate vicinity of the project. Mitigation measures have been incorporated in the Final EIS/EIR to reduce this impact to less than significant. No construction would occur on Saturday and Sunday.

During project construction, an increase in traffic and delays would occur on the selected haul routes. Hauling of materials and equipment to and from the project site would be primarily via Highway 101 and the three nearby on/off ramps. A maximum of about 15 to 20 truck trips per day would be required to transport excavated material from the creek bed to the staging area or disposal sites. Compared to the volume of traffic along the surface streets and U.S. Highway 101, the increase in number of truck trips is negligible and would be temporary.

Article 3, Recreation, Sections 30220 - 30221.

Recreational resources in the immediate vicinity of the project area are limited because the project passes through densely populated areas built prior to considerations of need for park space. As proposed, the project incorporates construction of habitat expansion zones within the project limits. These land parcels are small, but would provide natural habitat directly adjacent to the creek's banks. However, within the Coastal Zone (south of US Highway 101), there are a number of public recreational resources in the project vicinity, including Moreton Bay Fig Tree Park, West Beach, Skate Point Skateboard Park and Chase Palm Park.

Native riparian vegetation planting along the creek's banks, within the habitat expansion zones, would enhance opportunities to enjoy the creek while walking along, including activities like bird watching. In addition, seating areas could be provided within these small habitat expansion zones or be built into the replaced bridges, which could facilitate morning or evening walks and resting areas along the creek could be created. Recreational activities such as bird watching, walking along the creek, viewing of revegetated riparian habitat would be provided by implementation of this alternative. After completion of the project, more recreational activities would be available to the public compared to the existing conditions.

Installation of the oxbow bypass culvert, partially in an open space near the Fig Tree between Montecito and Yanonali Streets, would result in short-term impacts on recreational activities. Straightening of the channel and installation of culverts would run under the park area. Once the culvert is completed, it would be covered and the surface returned to its existing condition. Implementation of this alternative would not result in long-term adverse impacts to recreational resources.

R **Article 4, Marine Environment, Sections 30230 - 30237.**

The lower part of Mission Creek affords significant habitat for two Federally endangered fish species, the tidewater goby (*Eucyclogobius newberryi*) and southern California steelhead (*Oncorhyncus mykiss*). A coastal, tidal lagoon forms in the summer months where Mission Creek

empties into the Pacific Ocean on the beach side of Cabrillo Boulevard. It provides the principal habitat for gobies and is essentially a marine environment. A plastic pipe buried in the sand at the edge of the beach and roughly 30 inches in diameter, a pipe which transports spoils from harbor dredging, may abet the formation and persistence of this lagoon. Steelhead historically used Mission Creek as a migration corridor to spawning beds upstream.

Project construction will restore a soft bottom to Mission Creek or retain that soft bottom if it is already present. The proposed project would not change the channel in any manner which would impede upstream or downstream passage of steelhead. Since Lower Mission Creek affords neither gravely shoals nor exposed sand bars and other features where fry could hatch, steelhead do not treat it as a spawning reach. Hence, leaving existing soft bottoms or removing extant concrete bottoms would not influence potential spawning behavior either directly or indirectly.

During construction of the project, temporary impacts may occur to steelhead and gobies. The USACOE has extensively coordinated the proposed project design with NMFS and USFWS, and developed mitigation measures to minimize impacts to both species thorough planning of construction schedules, and implementation of structural features. Therefore, project related potential impacts would be minimized to the maximum extent. To avoid impacts to these fish, no construction equipment shall be operated within the channel and stream bottom between December 1st and March 30th or whenever significant water flows pass down Mission Creek. All construction work **downstream** of Yanonali Street shall be performed after June 1, provided no significant stream flows are occurring in Mission Creek. Construction **upstream** of Yanonali Street shall be restricted to dates between June 1st and December 1st if water flow in the Caltrans Channel is more than ½ inch deep. If no continuous surface water flow exists in the Caltrans Channel after April 15th, construction could occur from then until December 1st.

Construction below Yanonali Street imposes different needs for environmental commitments because this project reach is likely to be inhabited by tidewater gobies. It will be necessary to create with some impermeable material (possibly sheet piling) a temporary enclosure which can be de-watered. While still wet, a biologist knowledgeable of tidewater gobies and the ecological niche they inhabit would seine the enclosure thoroughly for gobies. The biologist must have appropriate authorization from the US Fish and Wildlife Service for such incidental take. Any and all gobies netted this way will have to be freed into the estuarine water outside the barrier. Once cleared of fish, the impounded half channel can be de-watered without additional impacts to tidewater gobies.

This process will be required twice. At the end of all construction in the dry half, the end barricades need to be withdrawn slowly to allow gradual flooding, preferably from the downstream end. The end barricades would then be moved to the other half of the channel, and the process of netting fish to safety, de-watering, and construction begun again. See details in Section 10 of the EIS/EIR. Details are also provided in enclosed Biological Assessments.

The project design has been revised, based on coordination with USFWS and NMFS, to include measures that will enhance habitat for both the steelhead and the tidewater goby. These include permanent and durable mitigation features that would create hiding places where fish may take refuge. They would be composed of four separate structural elements formed by coarse surface relief of the walls (goby refugia), artificial overhangs projecting from the walls (fish ledges), and

placing double rows of coarse boulders (fish baffles) between the overhangs along the creek walls (See Figure 3.5.2.1-18 of Enclosure 1) and rock energy dissipaters. In combination, they should provide shelter for fish of all sizes.

Article 5, Land Resources, Sections 30240 - 30244.

Although Lower Mission Creek is an Environmentally Sensitive Habitat Area, a flood control project is dependent upon the creek and may, therefore, occur. Measures to mitigate the impacts of construction have been incorporated into the Project Description, as discussed above. Habitat values will be greater when the project is completed than is the case now.

Current land uses in the study area and in the vicinity of the project site consist of the highly urbanized downtown area, single-family, duplex and multiple-family residences, businesses, some industries, and public property (including small parks) adjacent to the creek. In many areas, homes and businesses are immediately adjacent to the creek banks, but limited open space still exists in some reaches. Very little vacant land is useable for development within the project area. Most of the vacant land is owned by either Santa Barbara County or the Santa Barbara County Flood Control District and is intended as creek right-of-way. Immediately north of the freeway, the State of California owns a remnant parcel, left over from the construction of the Crosstown Freeway. Union Pacific Railroad also owns a vacant parcel adjacent to Moreton Bay Fig Tree Park on Montecito and Chapala Streets. There are also a few privately owned vacant parcels scattered throughout the project area.

The remainder of the properties in the project area have been developed in one way or another. Many of the residentially zoned parcels are developed to the maximum density allowed by the zone and their lot size. This is also true for much of the area zoned for commercial or hotel and related commerce uses.

Article 6, Development, Sections 30250 - 30255.

Downstream of Canon Perdido Street, Mission Creek passes through a highly urbanized section of the City of Santa Barbara. Existing banks have been stabilized by property owners, as observed during field visits. These banks have been stabilized by using: stacked sand bags or concrete bags; dumped rocks with soil packed between them; sprayed concrete surfaces; grouted stone; jointed masonry walls; wooden pilings or bulkheads; and sandstone walls. The slope of the creek varies from vertical to gentle throughout the project reach. Some residents view the lagoon as little more than a cesspool, especially in the summer when tidal exchange is limited or non-existent. They refer to the creek in this area as a "drainage ditch" or "sewer lagoon."

Litter is common in the channel and adjacent areas, and increases in magnitude proceeding south along the channel. Some residents value the lagoon and other areas of the creek for their recreational and biological resources, especially considering the scarcity of natural creeks in urban settings in southern California. They also value the "buffer zone" between residences and businesses created by the creek. Vegetated banks also block lights from structures and street lamps located across the creek. Sounds from the creek are also pleasing to many residents. These sounds include the "singing" of frogs and birds, and water flowing over rocks.

Planting native riparian types of vegetation on the upper slope of the creek would increase aesthetic values. Establishment of vegetation on the creek banks would enhance aesthetic values of the project area compared to other alternatives and existing conditions. Lower vertical walls may not be visible to people walking along the creek banks due to the vegetation growth on the upper banks. Aesthetic treatment would be applied to visible lower banks to minimize impacts of the vertical walls. During the public scoping meeting, people voiced their concerns regarding aesthetic resources located within the project area. The new constructed channel would be pleasing and natural looking. Their concerns are addressed by implementation of this alternative. The visual quality of the project reach would have positive impacts on tourists visiting the City of the Santa Barbara. Within a few years, planted vegetation would be mature, and trees would increase the visual value of the project area. It should be noted, however, that full height vertical walls would be used for most of the distance between State and Mason Streets. These walls would also receive aesthetic treatment, including the use of colored concrete and forms that would mimic the appearance of sandstone or natural vertical creek banks. A Mission Creek Design Subcommittee, consisting of representatives of the City Architectural Board of Review, Historic Landmarks Commission, Planning Commission and Parks and Recreation Commission will review wall and bridge designs and landscaping.

No gallery of tree tops exists within the project boundary, although there are individual stately native trees at various locations along the creek. Similarly, no layer of shrubby native plants, normally found beneath a tree canopy in its natural setting, grows along this section of Mission Creek. In addition, urban refuse is a very common sight throughout the project area. Given the limited right-of-way and availability of the land for the project, this project alternative provides maximum visual quality for the project reach. The visual resources would be improved significantly by implementation of the proposed project. In comparison to the existing condition, the project would result in long term beneficial impacts.

The Moreton Bay Fig tree is located in vicinity of Chapala and Montecito Street. The tree was originally from Australia, transplanted as a seedling in 1877. This tree, City Landmark, adds extremely high historical and aesthetic values for the citizens of and visitors to Santa Barbara. This tree has been determined to be largest tree of its species in the United States (see discussion under the Cultural Resources Section). The Moreton Bay Fig tree area is highly visible to tourists and residents who utilize this area for recreational purposes.

During construction of the project, excavation of the creek, stabilization of the creek banks, stockpiling of excavated material and staging area for parking equipment, would have significant visual impacts to the neighborhood of the project area. The project area is located within a highly urbanized/ residential and commercial zone of the City. Tourists and residents to reach the beachfront area and Stearns Wharf heavily utilize the area between Mason Street and Cabrillo Boulevard. Construction related impacts are significant but short-term; conditions will return to normal after construction is completed.

The CCC raised concerns about construction of vertical walls within the coastal zone. At the request of the CCC, the USACOE performed an informal economic analysis of two smaller versions of the Recommended Plan; both would have a conveyance capacity of 2500 cfs providing approximately 15-year level of protection. The first alternative would use the combination toe wall and riprap slope (similar to the Recommended Plan) to protect and stabilize the creek banks, and the second alternative would use riprap slope protection to stabilize the entire height of the banks. Both

alternatives would apply the proposed bank protection upstream and downstream of Highway 101. Results of this informal analysis can be found in the Economic Appendix of the Main Report. Available information from the earlier 2500 cfs Alternatives found in the feasibility report, including construction costs, right-of-way costs and damage reduction benefits were used in this analysis. The results indicate that these two alternatives would not be economically feasible and, therefore, Federal participation in the proposed project could not be justified. If there is no Federal participation, necessary flood control will not occur.

Constraints of acquisition of real property do not allow implementation of vegetated sloped banks south of Highway 101. Use of custom molds which would simulate the appearance of sandstone block joinery found elsewhere in this area would minimize the potential affront caused by the channel's appearance (letter from the City of Santa Barbara, Enclosure 7).

Mitigation measures have been incorporated in the project design, which includes: aesthetic treatment, including the use of colored concrete and/or pouring concrete in forms that would mimic existing sandstone walls or natural vertical creek banks, shall be incorporated into project plans to minimize project-related impacts; planting of vines shall be required along the creek banks to cover vertical walls; bridges shall be designed to retain an appearance appropriate to the character of the neighborhood in which they are located; upgraded or improved fencing shall be provided along the banks or planting of vines along fencing. By implementation of these measures, the project would have positive impacts on aesthetic resources.

Article 7, Industrial Development, Sections 30260 - 30265.

The proposed improvement of Lower Mission Creek consists of construction of a soft-bottom channel, stabilization of creek banks by combination of vertical walls and vegetated riprap, replacement of bridges, installation of culverts, and construction of habitat expansion zones. The project purpose is to provide flood protection to the City of Santa Barbara. The project does not have any features of industrial development, and therefore, is not applicable to the conditions set forth in the aforementioned section.

Enclosures:

1. Project Description
2. Mitigation Monitoring Plan
3. Biological Assessments for Steelhead and Tidewater goby
4. Steelhead Biological Opinion, prepared by NMFS
5. Revised HEP Analysis
6. Coordination Act Report, prepared by USFWS
7. Letter from the City of Santa Barbara
8. Letter from SHPO regarding Section 106

Note: Enclosures will be provided to the CCC with the submittal of the revised CCD.

APPENDIX - E

CLEAN WATER ACT SECTION 404(b)(1) EVALUATION

LOWER MISSION CREEK FLOOD CONTROL PROJECT SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

THE EVALUATION OF THE EFFECTS OF THE DISCHARGE OF DREDGED OR FILL MATERIAL INTO THE WATERS OF THE UNITED STATES (404(b)(1) Evaluation) FOR LOWER MISSION CREEK FLOOD CONTROL PROJECT SANTA BARBARA, CALIFORNIA

I. **INTRODUCTION**. The following evaluation is provided in accordance with Section 404(b)(1) of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500) as amended by the Clean Water Act of 1977 (Public Law 95-217). Its intent is to succinctly state and evaluate information regarding the effects of discharge of dredged or fill material into the waters of the U. S. As such, it is not meant to stand alone and relies heavily upon information provided in the environmental document to which it is attached. Citations in brackets [ ] refer to expanded discussion found in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR), to which the reader should refer for details.

Project Purpose: Section 230.10(a)(2) of 404(b)(1) guidelines states "an alternative is practicable if it is available and capable of being done after taking into consideration costs, existing technology and logistics in light of overall project purposes." One of the primary objectives is to reduce flooding damages to residential and commercial properties in the floodplain (See Section 2 of the Main Report). Twelve alternatives were developed during the feasibility study. However, these alternatives were similar in nature; therefore, based on criteria, similarities and differences in the basic design features, the decision was made to evaluate four Alternatives for detailed environmental analysis in the Final EIS/EIR. They are Alternatives 1, 6, 8, and 12. Alternative 1 continues to be the No Action plan against which the consequences of structural solutions are evaluated. Details of these Alternatives are described in [Section 3.5 of the EIS/EIR]. Alternative 12 best satisfies the overall project purpose and provides maximum incidental environmental benefit compared to the other viable alternatives. Therefore, we consider Alternative 12 to be the least environmentally damaging practicable alternative.

The project purpose is to provide 20-year flood protection to the City of Santa Barbara. Any proposed alternative along Lower Mission Creek would necessarily require future maintenance including sediment and debris removal to maintain creek storage and flood flow capacity during storm seasons. Without any maintenance, the City and surrounding areas would be frequently inundated by flooding, with risk to life and property. Therefore, even Alt.1 (the without project conditions plan) assumes maintenance of the channel through sediment removal. Future maintenance is a part of the project design. Impact analysis and mitigation measures are included for future maintenance in the Final EIS/EIR.

II. PROJECT DESCRIPTION.

A. **Location**: The Mission Creek drainage area is located in and adjoining the city of Santa Barbara, California, about 100 miles northwest of the City of Los Angeles. The drainage area, comprising about 11.5-square miles, is a narrow coastal area and extends from the Santa Ynez Mountains on the north to the Pacific Ocean on the south. Mission Creek rises at about

4,000 feet elevation and flows about 8 miles through the City of Santa Barbara to empty into the Pacific Ocean [see Figure 1.1-1 of EIS/EIR]. The study is limited to the final 1.2 miles of the creek, from just downstream of Canon Perdido Street to Cabrillo Boulevard.

B. **General Description** [3.5 and 3.5.2, 3.5.2.1,3.5.2.2]: The EIS/EIR addresses environmental impacts related to the four alternatives (including the No Action Alternative) to flood control on the lower Santa Paula Creek.

Alternative 12 is the National Economic Development (NED) Plan, as well as the tentatively Recommended Alternative. This Alternative would provide maximum incidental environmental benefits, and it is an environmentally superior plan compared to other viable alternatives considered during the feasibility study.

R The project description and procedures for its maintenance have been revised based on hydraulics/engineering, real estate constraints, and comments received from the resource agencies to include structural features to mitigate or minimize impacts to the biological resources, particularly to the Federally listed species, steelhead and tidewater goby. Future maintenance of the constructed channel and culvert and weir length and height have been modified based on additional hydraulic analysis performed for the Recommended Plan.

Alternative 12 consists of: improvements to the channel for approximately the last mile of the creek between the Canon Perdido Street Bridge at the upstream end, and the Cabrillo Boulevard Bridge near the outlet; replacement of four bridges, streamlining bedslope, installing a culvert that bypasses the oxbow, stabilizing creek banks using short vertical walls and riprap sideslope; and planting of native vegetation along the riprap. The creek width would range from 60 to 70 feet at the top. The specific width of the channel at each bridge crossing is listed in Chapter 4, Plan Formulation, of the Main Report. The average depth of the creek would be 8 to 12 feet throughout the project reach. Future maintenance for the life of the project is included in this project description. Future maintenance of the constructed channel is essential to retain the form and design capacity of the creek. Impacts related to future maintenance are addressed in the EIS/EIR. Chapters 6 through 19 of the EIS/EIR provide existing conditions and address impacts related to this proposed project. Environmental commitments and mitigation measures are included to avoid/reduce or minimize impacts to natural and cultural resources [see Section 24, Mitigation Monitoring Plan (Appendix H); Biological Assessments (Appendix A); and Biological Opinion for Steelhead (Appendix B-1)].

This alternative would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of flood protection. The natural bottom would be maintained, or restored to natural sediments where now hardened by concrete, and creek banks would consist of a combination short vertical wall and ungrouted riprap. The bottom half of the bank would consist of a vertical wall while the upper half would be built with riprap at a 1.5:1 (H:V) slope. Aesthetic treatment would be incorporated into the project design to minimize the visual impacts of vertical walls. The riprap would be covered with topsoil. Concrete pipes of varying sizes (up to a maximum of three feet in diameter) extending through the riprap layer to underlying soils would be strategically placed to allow planting of native trees and vegetation. Native willows or branches and other native herbaceous plants would be planted beneath the riprap and would sprout through gaps in it to form continuous understory riparian growth.

Upstream of Highway 101, the combination of vertical wall and riprap would be the predominant bank treatment, except in two short reaches just upstream of the Haley/De la Vina and De la Guerra Bridges. Below Highway 101, the combination of vertical wall and riprap

would be applied along the southeast bank, starting from midway between the Chapala and Mason Street Bridges to the State Street Bridge. Vertical walls would be maintained for the remainder of this reach.

The improved creek would generally follow the existing alignment and would incorporate a new culvert between Highway 101 and Chapala Street Bridge that would bypass the oxbow. The oxbow would be left in place to function as the low flow channel.

Five small parcels of open land would be left along the banks after completion of project construction. These parcels range in size between 0.03 and 0.14 acres (Fig. 3.5.4). These parcels would be used to expand the area planted to creek bank vegetation, so called "habitat expansion zones." Each habitat expansion zone would be designed to serve a dual purpose: to expand the corridor of riparian habitat to be planted along the stream banks, and to provide for passive park space for area residents. Native trees, primarily western sycamores, cottonwoods, and coast live oak, from local nursery stock would be planted in the habitat expansion zones. In time, their canopies would form dense clusters on the overbank and adjacent to stream corridor. In some of these zones, pathways and benches might also be added to create passive park spaces.

Planting along the riprap and planting of native trees in habitat expansion zones are an integral part of the project design. The ecological values generated by these features will offset the impacts from the implementation of the proposed alternative on existing stream bank vegetation. Therefore, no mitigation will be required for the temporary loss of habitat along the stream banks. This proposed alternative provides maximum habitat values compared to all other alternatives evaluated in this is document. In the long-term, the habitat value within the project reach would exceed the value of the existing habitat. If any of the planting on the aforementioned features is deleted from the project design, then impacts related to the bank vegetation would
need to be recalculated, which could result in additional mitigation.

R This alternative would also provide the opportunity to construct another habitat expansion zone in the vicinity of the oxbow formation area. This habitat expansion zone would be located just upstream of Highway 101. It would be located in the vicinity of De la Vina Street on the west and Gutierrez Street on the north. The total area to be created would be about 0.6 acres [25,800 square feet, see Figure 3.5.3 for location]. This area was originally proposed as a constructed wetland. However, after further review, it was determined that this site is more suitable for use as a habitat expansion zone, as described above. The construction of this feature would provide additional ecological benefits. However, its construction would be subject to cleanup of the existing known contamination on the site [see details in Section 15, HTRW of the EIS/EIR]. If, prior to the completion of project construction, the designated site is remediated, then the habitat expansion zone would be constructed as planned.

Removal of Existing Bank Protection and Earthen Material:

The creek bottom and banks for about a mile, between the Canon Perdido Street and Cabrillo Boulevard Bridges, would be excavated to increase the creek capacity to provide a 20-year level of flood protection to the City of Santa Barbara. The removal of all existing banks would occur within the project reach, except for a retaining wall located just upstream of De la Guerra Bridge, and both banks along the oxbow between Highway 101 and the Chapala Street Bridge. The excavation of the channel would begin from the downstream end of the project near Cabrillo Boulevard and progress upstream.

R The total amount of material to be excavated from creek banks and creek bottom would be about 82,000 cubic yards (cy). Creek excavation would occur section by section. Therefore, all 82,000 cy of material would not be stockpiled at one time. About 17,000 to 18,000 cy of material would be utilized in project construction as fill material. The remaining 64,000 cy of excavated material can be stockpiled or be taken to a county yard for storage or recycling depending on whether it meets project specifications. Expected debris would include stacked burlap bags filled with concrete, large rocks, mortared riprap, slabs of concrete, grouted stone, jointed masonry walls, shot-crete walls, wire baskets filled with coarse rock (gabions), formed walls, wooden pilings, and other bank material found throughout the length of the project. The material could be distributed to other construction sites requiring fill. All of the sandstone not used in project construction will either be conserved for use in other City projects or, if badly damaged, recycled. Most of the metal and concrete can be recycled. The green waste can be composted and recycled as compost and mulch. The USACOE will examine suitability of the excavated material for beach nourishment. If material is suitable, it can be used to restore sand supply on local beaches.

It is assumed that very small amounts of excess material would be transported within a radius of about 10 to 25 miles from the project site. At maximum, about 30,000 to 40,000 cy of material would need to be transported to the disposal sites either at the Tajiguas Landfill, located 25 miles west of the project site or used in a reclamation site (if one exists at the time of construction).

Stabilization of Creek Banks:

The existing creek banks would either be replaced with the combination short walls and riprap sideslopes or vertical walls. The vertical walls would be constructed in two methods, according to their proximity to any existing structures. The first method would be the use of an inverted "T" footing. This less expensive construction method would be applied in areas where sufficient rights-of-way are available without directly impacting existing structures. In areas with limited rights-of-way and close proximity to structures, a pier footing construction design would be applied. Typical cross sections of these designs are shown in the Plates found at the end of the Main Report, and figure 3.5.21-1, 3.5.2.1-2 of the EIS/EIR.

Where the riprap-vertical wall is used, the height of the wall would be approximately half the depth of the creek. The riprap sideslope would be built at a 1.5:1.0 slope. Concrete pipes of varying sizes, placed vertically in between the riprap, would serve as openings for planting of native riparian vegetation. The riprap sideslope would be covered with topsoil and planted with ground cover and shrubs that would help develop the understory of the larger riparian canopy along the creek.

R **Weir Inlet and Culvert that Bypasses the Oxbow :**

The reach referred to as the "oxbow" is where the sharpest bends of the creek within the project area are found. The oxbow runs the length of the creek between the Gutierrez and the Chapala Street Bridges, where the creek makes several sharp turns, while crossing Highway 101, the Montecito Street Bridge, and Union Pacific Railroad before joining its most direct path to the Pacific Ocean [See Figure 3.5.2.1-3]. The culvert (two 15-foot wide by 6-foot high boxes) connecting both ends of the oxbow is referred to as the overflow culvert or the "oxbow bypass." The overflow culvert would follow a more direct path across the oxbow. It would begin upstream of Highway 101, pass under the highway (where CalTrans had built a span to accommodate such a crossing to eliminate impacts to highway traffic), Montecito Street, and the railroad tracks before rejoining the creek alongside the downstream end of Chapala Street Bridge [See Figure 3.5.2.1-3 of the EIS/EIR].

A weir structure [see Figure 3.5.2.1-4, EIS/EIR] would be built at the inlet of the culvert to control the flows through the culvert and the oxbow. The height of the weir would be set in order to direct lower flows of up to 640 cfs through the oxbow. Also, the weir would split higher flows (up to the design conveyance capacity of 3400cfs) between the culvert and the oxbow. The culvert divider would be designed to form a "bullnose" and help minimize the potential for debris blockage. Refer to Exhibits in the Main Report for the details of these design elements.

Removal and Replacement of Bridges:

Lower Mission Creek is spanned by twelve bridges before emptying in to the Pacific Ocean. Four of those bridges would need to be replaced including Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges. De La Vina Street Bridge will be replaced by the city prior to implementation of this project. It is expected that the sequence of the remaining bridge demolition and reconstruction would complement the creek improvement construction schedule. Construction of the bridge replacements at the road crossings would need to be phased so that the adjacent road crossing could be used as a detour. Bridge reconstruction would start with the most downstream bridge (Mason State Bridge) and progress sequentially in the upstream direction ahead of the creek improvements. This would enable flood control benefits to be realized for the area downstream of the improved creek during the construction phase. [See Section 3.5.2 of the EIS/EIR for the detail description of the bridge replacement.]

R **Pilot Channel:**

The project's design for the creek's invert includes scoring a "pilot channel" into the bottom as the last element of construction. Otherwise, the streambed would be a uniformly flat expanse of native sediments between the toe walls. This pilot channel would constitute a permanent component of the instream habitat between Canon Perdido Street and Highway 101, although one possibly given to positional shifts as the finished creek bed evolves. No pilot channel would be fashioned into the creek bed below Yanonali Street. Between Yanonali and Mason Streets periodic tidal ebb and flow would largely negate the intended purpose of such a channel, and below Mason Street the tidal movements would very quickly would make it thoroughly ineffective.

A pilot channel large enough to carry at least 50 ft^3/sec would be adequate to carry water along the preferential innate course. Its physical size and shape would also be determined after final hydraulic analyses, but would probably be trapezoidal in appearance and 10 to 12 feet wide and about 1 foot deep. The channel would be enriched with representative types and gradations

of the larger native substrates - coarse gravels, small cobbles, and rocks or boulders as currently exist within Mission Creek.

R **Structural Features to Mitigate and Avoid Impacts to Biological Resources:**

Several structural features would be included to avoid and mitigate impacts to biological resources. These permanent and durable mitigation features would create hiding places where fish may take refuge. They would be composed of four separate structural elements formed by coarse surface relief of the walls (goby refugia), artificial overhangs projecting from the walls (fish ledges), and placing double rows of coarse boulders (fish baffles) between the overhangs along the creek walls [See Figure 3.5.2.1-18 EIS/EIR] and rock energy dissipaters. In combination, they should provide shelter for fish of all sizes. [See Section 3.5 of the EIS/EIR for the detailed description of these features. Section 10 and Biological Assessments provide purpose, implementation and mitigation provided by these features.]

Material Required for Construction:

Material required for project construction includes: earth-fill material; concrete for walls, footings, and the box culvert; rocks/riprap for slope protection; steel reinforcement for concrete support; filter material; fencing material; top soils; planters; and material required to establish vegetation. Most of the material would be obtained from a distance of about 5 to 10 miles radius from the project area.

Duration of Construction:

Project construction, including the proposed creek improvements, oxbow culvert, and bridge replacements, is expected to take a minimum of two years to complete. During construction, excavation activities would not be carried out during heavy rain and flooding season. Every effort would be made to complete project construction within two years. However, due to weather conditions/seasonal heavy rainfall, mechanical failure, or funding constraints, project construction could be delayed. In that case, project construction could take up to three or four years to complete. Project construction is scheduled to begin in mid-2003. The construction start date is dependent upon finalization of the EIS/EIR, compliance with all environmental regulations, and availability of the necessary funding.

Project construction would not occur within flowing water between December 1st and March 30th to avoid potential impacts to adult steelhead, a Federally listed species. Between April and the end of May, a biologist would monitor select locations upstream for the presence of young steelhead preparing to swim down to the ocean. Either the USACOE or an environmental contractor would fulfill this monitoring commitment. Temporary, brief suspensions of construction could occur during these two months.

Staging / Stockpiling Areas:

The proposed staging area would be located north of Highway 101 adjacent to the channel with access off of De la Vina Street. This area could also be used for construction access. Another possible staging area would be located north of the channel between the railroad and Yanonali Street. At this staging area, the selected contractor would install a temporary trailer with the sanitary facilities. Small quantities of material excavated (about 3000 to 4000 cy) from the creekbed would be stockpiled at these local staging areas, but the majority of it would be transported to the remote stockpile/disposal site, about 10 to 25 miles from the project area.

Material would be processed on site to be used for the project construction. The material could be distributed to other construction sites requiring fill. All of the sandstone not used in project construction will either be conserved for use in other City projects or recycled. Most of the metal and concrete can be recycled. The green waste can be composted and recycled as compost and mulch. The USACOE will examine suitability of the excavated material for beach nourishment. If the material is suitable, it can be used to restore sand supply on local beaches. Suitable material, about 18,000 cy, would be utilized in the project construction. Additional access points could be at State Street, Mason Street, Montecito Street, Cota Street, Bath Street, Ortega Street, and north of De La Guerra Street.

The staging area is a part of the project description. Staging areas are located along the creek banks. Impact analysis of staging areas is incorporated in to the alternative analysis. No separate discussion has been provided for identification of impacts related to the staging areas.

Equipment for Excavating Creek and Establishing Creek banks.

Construction equipment required for excavation of the creek and stabilization of the creek bank would include two graders, three dozers, four bucket excavators, two loader, one water truck, and dump trucks. Future maintenance would require two excavators and about 4 to 8 truck trips per day to transport the sediment.

R **Future Operation and Maintenance:**

Future maintenance of the creek is an integral part of the recommended alternative, Alternative 12, because flood flows and debris accumulation and removal would continue to impact channel vegetation and aquatic resources. To ensure and maintain its design function and form, some work to maintain the design capacity of the channel would be needed on a regular basis. Any areas where sediment deposition and/or vegetation growth occur beyond 15% of the channel capacity would be required to be removed to maintain the capacity of the project reach. Future maintenance would also include maintenance of the structures such as cleaning of oxbow bypass culverts, pilot channel, repair of vertical concrete walls and riprap (including bottom riprap lining and baffle piers), structures for mitigation, and maintenance of planted vegetation (after initial establishment required as part of project construction). It is estimated that the frequency of sediment removal would be at an interval as often as once a year. However, when several low-flow years occur sequentially, sediment removal might occur every two to three or more years. Over time, pools and riffles that provide aquatic habitat would reestablish in the channel [see details in Section 3.5 of the EIS/EIR].

Impact analysis for future maintenance is included in each resource is discussed in the EIS/EIR. Impacts related to maintenance activities are addressed in Chapters 6 through 19. Mitigation measures for future operation and maintenance for the life of the project are included in the EIS/EIR. Conditions identified in the EIS/EIR, Mitigation Monitoring Plan, Biological Opinion for steelhead and Biological Assessment would be followed during each operation and maintenance activity. A brief description of each activity is provided in the following paragraphs.

R **Future Maintenance of the Pilot Channel:**

The need for maintenance of the creek's capacity will occur after completion of the project when, or if, sedimentation and/or vegetation growth in any reach particular project reach in the project area exceeds 15% of the flow capacity. When maintenance needs do not dictate

removal of sediments, the County Flood Control District would not alter the currently existing pilot channel, but instead would only cut such vegetation as has begun to grow to unacceptable size. When sediments must be removed during the course of normal maintenance activities, the County would finish the work by reconstructing the pilot channel. This rebuilt channel would deliberately follow whatever course the creek had imposed on the original alignment of the pilot channel. In this fashion, the pilot channel would reflect an alignment that came about through natural processes, and which would be optimally efficient in the transport of sediments during low flow times of the year. The maintenance cycle would conclude by enrichment of the rebuilt channel with representative types and gradations of the larger native substrates.

Channel Shaping and Channel Desilting - Sediment Removal:

The Corps of Engineers performed a sediment transport budget analysis for the recommended plan. The general results indicated that there would be localized areas throughout the project reach that would experience either sediment deposition or erosion/scour conditions. An approximate quantification of these processes for with and without project conditions is summarized and presented in respective sediment budget tables found in Appendix B - Hydraulics.

The change from existing conditions to design conveyance capacity would alter the net sediment budget for the entire project very slightly. A net total of 25 cy should accumulate each time the creek carries an average storm event. In contrast, individual higher peak flows should promote net erosion from the streambed, 35 cy during a 5-year storm event and roughly ten times that quantity removed during a single design event. Future sediment accumulation is dependent upon the size and number of storm events. However, future maintenance would be similar to existing maintenance performed by Santa Barbara County. As an example of maintenance activities, the last time the County removed about 350 cy of sediment between Canon Perdido Street and Highway 101 in the summer of 1997. Evidently, no sediments were removed from the sandstone channel (between Montecito and Yanonali Streets) at that time. No maintenance of any kind (other than occasional trash removal) has been performed in the estuary (between Yanonali Street and Cabrillo Boulevard). No maintenance would be required within estuary.

Stream Bed Maintenance. Inspection and maintenance of the streambed would address vegetation control, fish baffles, rocky energy dissipater and boulder fields, desilting, and shaping. Vegetation control would be accomplished by either brushing, clearing or spraying. Clearing could be done using mechanical equipment such as a dozer. Partial removal of vegetation would occur yearly. The maintenance would follow a mosaic pattern, wherein one half the creek bed would be mowed or brushed in any one year. The other half of the streambed would be treated the same way the following year. Fish baffles, rocky energy dissipaters and boulder fields shall be periodically inspected. Rip-rap or boulders designed to be placed within the streambed shall be replaced back into the intended design location, if removed or dislodged by any means. Maintenance for desilting and streambed shaping would typically be done with a dozer or loader. Typically, accumulated sediment would be pushed to an area where the material can be loaded directly into trucks driving on the channel bottom or to an area where a crane (at the top of bank) can access the material, which could then be loaded into trucks and hauled to a suitable disposal site. It is possible that lesser amounts of sediment could be placed on the riprap slope.

Duration of Future Operation Maintenance:

Usually, sediment removal would occur only when the flow of water approaches the seasonal minimum, i.e. between mid-August and mid-October. Operation and maintenance

would not occur between December and March to avoid impacts to steelhead and tidewater gobies, both Federally listed species. However, in the case of a heavy storm event, operation/maintenance of the channel invert could be required between December and March. If maintenance work occurs during these months in flowing water, a qualified biologist would be needed on site to monitor the sediment removal activities. Environmental commitments identified in Sections 6 through 24 and the Mitigation Monitoring Plan in the EIS/EIR would be followed during future sediment removal operations. Future sediment removal activity may take about 15 to 30 days per year.

Authority and Purpose [2.1 of EIS/EIR]:

The Lower Mission Creek Flood Control Project is authorized under Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), which reads in parts as follows:

"Sec. 209. The secretary of the Army is hereby authorized and directed to cause surveys for flood control and allied purposes, ... to be made under the direction of the Chief of Engineers, in drainage areas of the United States and its territorial possessions, which include the following named localities [including]:

All Streams in Santa Barbara County, California, draining the Santa Ynez Mountains, except Santa Ynez River and tributaries."

R D. **General Description of Excavated or Fill Material** [3.5.2 of EIS/EIR]:

As stated in section II.B above, approximately 82,000 cy of material would be excavated from the channel; out of this material about 18,000 cy of fill would be required for the project. The remainder of the material could be distributed to other construction sites requiring fill or recycled. All of the sandstone not used in project construction will either be conserved for use in other City projects or recycled. Most of the metal and concrete can be recycled. The green waste can be composted and recycled as compost and mulch. The USACOE will examine suitability of the excavated material for beach nourishment. If material is suitable, it can be used to restore sand supply on local beaches. It is assumed that very small amounts of excess material would be transported within a radius of about 10 to 25 miles from the project site. At maximum, about 30,000 to 40,000 cy of material would need to be transported to the disposal sites either at the Tajiguas Landfill, located 25 miles west of the project site or used in a reclamation site (if one exists at the time of construction).

Periodic Future Maintenance: Future upkeep would be required to maintain the design channel capacity would. Cleanout would occur after a significant amount of material is deposited into the channel in order to maintain channel capacity. On average, cleanouts would occur every two to three years. Cleanout would occur during low flow seasons.

Description of the Proposed Discharge Site [3.5]:

A detailed description of where material will be placed in the channel appears in the Final EIS/EIR. The following is a brief description of those activities.

Stockpiling Areas/Distribution of Material. Small quantities of excavated material would be stock piled at the proposed staging area, located north of Highway 101, adjacent to the channel with access to De la Vina Street. Another possible stockpiling area would be located

north of the channel between the railroad and Yanonali Street. The majority of material would be transported to construction sites requiring material, for recycling, or an existing disposal site, about 10 to 25 miles from the project area.

Stabilization of Creek Banks and Project Construction. Material required for project construction includes: earth-fill material; concrete for walls, footings, and the box culvert/weir; structural mitigation features, rocks/riprap for slope protection; steel reinforcement for concrete support; filter material; fencing material; top soils; planters; and material required to establish vegetation.

F. Description of the Excavation and Disposal Method:

Excavation of the Creek and Establishing Creek banks. The creek bed and banks would be excavated and the sideslope would be established with combination of vertical concrete wall and vegetated riprap. Excavation would be accomplished during the dry season and when water level is minimal in the creek. A low-flow channel would be created to divert existing water flow away from sediment removal area to minimize turbidity. No mechanized equipment would be permitted in flowing water between December 15 and the end of March.

III. FACTUAL DETERMINATIONS.

A. Disposal Site Physical Substrate Determinations:

(1). Disposal Site Physical Substrate Determination. Mission Creek is located on the southern slope of the foothills of the Santa Ynez Mountains. The stream originates in the mountains and across the foothills and flows through the City of Santa Barbara via a meandering course and flat alluvial plain near the Pacific Ocean. The Santa Ynez Mountains are a part of the east-west trending Transverse Range geologic province, and they are complexly folded and faulted within the project area. These mountains are composed of mainly igneous and sedimentary rock. The maximum elevation of these mountains behind Santa Barbara is about 4,000 feet.

The existing topographical environment adjacent to the lower reaches of Mission Creek is relatively flat, ranging from a 50 foot elevation at Carrillo Street to sea level at the outlet. Mission Creek bisects the City of Santa Barbara. The creek is narrow, usually between 40 to 50-feet wide, with dense urban land uses occupying most of the floodplain right up to the creek bank. The natural creek bank is fragmented by flood control features, including gabions, sacked concrete, piled stone, pipe and wire revetment and bulkhead structures. The creek bottom is made up of large cobble, sand and some overflow of concrete from flood control structures.

(2). Sediment Type. The Lower Mission Creek drainage basin/watershed is composed mainly of sedimentary rocks and sand. The excavated sediment is alluvial debris which is deposited in the stream channel during significant storm events.

(3). Dredged/Fill Material Movement. Material would be excavated when water flow is minimal. In addition, a low-flow channel would be created during construction and future debris removal operations. Excavated material would be transported to the stockpile area from the creek bed.

(4). Physical Effects on Benthos. Proposed project construction and periodic debris removal could cause the loss of most freshwater benthic invertebrates in the stream during

the time of debris removal. Also, the turbidity caused by debris removal is expected to impact benthic invertebrates in the immediate vicinity downstream. Implementation of the proposed project would result in loss of about 0.5 habitat units of aquatic habitat.

The project construction will restore a soft bottom to Mission Creek or retain that soft bottom if it is already present. Benthic invertebrates will have more sediments available as habitat once construction is complete. The proposed project is not expected to change the channel in any manner which would impede upstream or downstream passage of steelhead. Since Lower Mission Creek affords neither gravely shoals nor exposed sand bars and other features where fry could hatch, steelhead do not treat it as spawning reaches. Hence, leaving existing soft bottoms or removing extant concrete bottoms would not influence potential spawning behavior either directly or indirectly.

(5). Action Taken to Minimize Impacts [Section - 7.6.6, 10.4 and 23 of EIS/EIR]. The lower part of Mission Creek affords significant habitat for two Federally endangered fish species, the tidewater goby (*Eucyclogobius newberryi*) and southern California steelhead (*Oncorhyncus mykiss*). A coastal, tidal lagoon forms in the summer months where Mission Creek empties into the Pacific Ocean, on the beach side of Cabrillo Boulevard. It provides the principal habitat for gobies and is essentially a marine environment. A plastic pipe buried in the sand at the edge of the beach and roughly 30 inches in diameter, a pipe which transports spoils from harbor dredging, may abet the formation and persistence of this lagoon. Steelhead historically used Mission Creek as a migration corridor to spawning beds upstream.

R Structural mitigation features would be included to avoid and mitigate impacts to biological resources. These permanent and durable mitigation features would create hiding places where fish may take refuge. Some features would also assist steelhead as they travel upstream. They would be composed of four separate structural elements formed by coarse surface relief of the walls (goby refugia), artificial overhangs projecting from the walls (fish ledges), placing double rows of coarse boulders (fish baffles) between the overhangs along the creek walls, and rock energy dissipaters. In combination, they should provide shelter for fish of all sizes. See Section 3.5 of the EIS/EIR for the detailed description of these features; Section 10 and the Biological Assessments provide purpose, implementation and mitigation provided by these features. In addition, mitigation measures have been included to minimize project related impacts to the biological resources (see details in Section 10 of the EIS/EIR, Mitigation Monitoring Plan - Appendix H, Biological Assessments - Appendix A-1 and A-2, and Biological Opinion for steelhead - Appendix B-1).

The timing of construction schedules must be adjusted to minimize or avoid impacts to these two fish species. Broad scheduling commitments include:

precluding any use of machinery in the water when significant stream flows occur between mid-December and the end of March;

completion of all work between Cabrillo Boulevard and Yanonali Street between April and June, because gobies will be more inclined to enter the estuary as summer conditions begin to prevail;

restriction of all construction activities above Yanonali Street to the months between the beginning of June and the end of November, the time of year when steelhead would not migrate through the creek.

To minimize impacts to gobies, it will be necessary to close off both ends of the area to be de-watered with some impermeable barrier, then have a biologist knowledgeable of tidewater gobies and the ecological niche they inhabit seine the entire impoundment for gobies. The biologist must have appropriate authorization from the US Fish and Wildlife Service for such incidental take. Any and all gobies netted this way will have to be freed into the estuarine water outside the barrier. Once cleared of fish, the impounded half channel can be de-watered without impacts to tidewater gobies.

This process will be required twice. At the end of all construction in the dry half, the end barricades need to be withdrawn slowly to allow gradual flooding, preferably from the downstream end. The end barricades would then be moved to the other half of the channel, and the process of netting fish to safety, de-watering, and construction begun again. See details in Section 10 of the EIS/EIR. Details are also provided in enclosed biological assessments.

Construction below Yanonali Street imposes different needs for environmental commitments because this project reach is likely to be inhabited by tidewater gobies. Such a solution would permit steelhead to pass either direction in the wet half of the channel while construction can occur simultaneously in the dry half. Provided this avoidance measure is implemented between April and June, a window of 2 months duration, all construction of flood control structures in Mission Creek can be accomplished with no impact to steelhead.

During project construction and future maintenance, there are possibilities that there may be potential impacts on steelhead. For all construction activities which alter the banks or stream bottom above Yanonali Street, machinery must be excluded from the channel and stream bottom any time significant flows pass down Mission Creek between mid-December and mid-May. All construction activities above Yanonali Street should be restricted to the months between the beginning of June and the end of November. During those months, a double strand of silt fencing material should be strung across the channel below the current area of work to retain sediments dislodged from the banks or creek bottom. The strands need to be at least 30 feet apart to facilitate the lower fence trapping any sediments which swirl past the upper strand.

In-channel sediment removal will not occur during periods of high flow, therefore, turbidity impacts are expected to be minimized. Also during debris removal, water will be diverted to one side of the channel while debris is removed from the undiverted side. After cleanout of that side occurs, water will be diverted to the clean side and debris removed from the other side.

B. <u>Effect on Water Circulation, Fluctuation, and Salinity Determinations</u>:

(1). Effect on Water [Section - XX]. The following potential impacts were considered:

a. Salinity
_X_ _N/A _ _ _INSIGNIF. _ _ _SIGNIF.

b. Water Chemistry (pH, etc.)
_X_ _N/A _ _ _INSIGNIF. _ _ _SIGNIF.

c. Clarity
_ _ _N/A _X_ _INSIGNIF. _ _ _SIGNIF.

d. Color
_X__N/A___INSIGNIF.___SIGNIF.

e. Odor
_X__N/A___INSIGNIF.___SIGNIF.

Taste
_X__N/A___INSIGNIF.___SIGNIF.

g. Dissolved gas levels
_X__N/A___INSIGNIF.___SIGNIF.

h. Nutrients
_X__N/A___INSIGNIF.___SIGNIF.

I. Eutrophication
_X__N/A___INSIGNIF.___SIGNIF.

j. Others
_X__N/A___INSIGNIF.___SIGNIF.

(2). Effect on Current Patterns and Circulation. The potential of discharge or fill on the following conditions were evaluated:

a. Current Pattern and Flow
___N/A _X__INSIGNIF.___SIGNIF.

b. Velocity
___N/A _X__INSIGNIF.___SIGNIF.

c. Stratification
_X__N/A___INSIGNIF.___SIGNIF.

d. Hydrology Regime
_X__N/A___INSIGNIF.___SIGNIF.

(3). Effect on Normal Water Level Fluctuations. The potential effect of discharge or fill on tide stages is not applicable to this project.

C. Suspended Particulate/Turbidity Determinations at the Disposal Site.

(1). Expected Change in Suspended Particulate and Turbidity levels in the Vicinity of the Disposal Site: The construction activities may increase turbidity in the creek, but during June-November flow is expected to be at a minimum. Most of the precipitation in the drainage basin is received during the months of December through March.

Impact: ___N/A _X__INSIGNIF.___SIGNIF.

(2). Effects (degree and duration) on Chemical and Physical Properties of the Water Column.

a. Light Penetration
___N/A _ X__INSIGNIF. ___ SIGNIF.

b. Dissolved Oxygen
___ N/A _ X__ INSIGNIF. ___SIGNIF.

c. Toxic Metals & Organic
___N/A __X _INSIGNIF. ___SIGNIF.

d. Pathogen
___N/A _ X__INSIGNIF. ___SIGNIF.

e. Aesthetics: Temporary effect expected
___N/A _ X __INSIGNIF. ___SIGNIF.

f. Others
_ X __N/A ___INSIGNIF. ___SIGNIF.

(3). Effects of Turbidity on Biota: These impacts are considered insignificant because the construction will occur during low flow and water will be diverted so that construction does not occur in the flowing stream, thereby reducing turbidity impacts.

a. Primary Productivity
___N/A _ X __INSIGNIF. ___SIGNIF.

b. Suspension/Filter Feeders
___N/A _ X__ INSIGNIF. ___SIGNIF.

c. Sight feeders
___N/A _ X__INSIGNIF. ___SIGNIF.

(4). Actions taken to minimize impacts. See section 3.A.(5). above.

D. Contaminant Determination

No chemical or biological impacts are expected at the disposal site.

E. Effect on Aquatic Ecosystem and Organism Determinations: The following ecosystem effects were evaluated [4.X]: The proposed construction is not significantly different from the No Action Alternative and is expected to have no significant effect on aquatic organisms, special aquatic sites, or threatened and endangered species.

(1). On Plankton _X__N/A __ _INSIGNIF. ___SIGNIF.

(2). On Benthos ___N/A _ X__INSIGNIF. ___SIGNIF.

(3). On Nekton _X__N/A __ _INSIGNIF. ___SIGNIF.

(4). Food Web ___N/A _ X__INSIGNIF. ___SIGNIF.

(5). Sensitive Habitats:

a. Sanctuaries, refuges
_X_ _N/A _ _ _INSIGNIF. _ _ _SIGNIF.

b. Wetlands
_X_ _N/A _ _ _INSIGNIF. _ _ _SIGNIF.

c. Mudflats
_X_ _N/A _ _ _INSIGNIF. _ _ _SIGNIF.

e. Vegetated Shallows
_X_ _N/A _ _ _INSIGNIF. _ _ _SIGNIF.

f. Coral reefs
_X_ _N/A _ _ _INSIGNIF. _ _ _SIGNIF.

g. Riffle and Pool Complexes
_N/A _ _X _INSIGNIF. _ _ _SIGNIF.

(6). Threatened & Endangered Species
_X_ _N/A _ _ _INSIGNIF. _ _ _SIGNIF.

(7) Other Wildlife (grunion,trout)
_X_ _N/A _ _ _INSIGNIF. _ _ _SIGNIF.

(8). Actions taken to minimize impacts. See section 3.A.(5) above.

F. Proposed Disposal Site Determinations:

(1). Mixing zone determination. The mixing zone for the disposal site is confined to the smallest practicable zone.

R (2). Compliance with Applicable Water Quality Standards.

The Clean Water Act governs discharge or dredging of materials in the waters of the United States and it governs pollution control and water quality of waterways throughout the U.S. Its intent, in part, is to restore and maintain the biological integrity of the nation's waters. The goals and standards of the Clean Water Act are enforced through permit provisions. Sections 404, 401 and 402 of the Clean Water Act pertain directly to the proposed project. Section 404 outlines the permit program required for dredging or filling the nation's waterways.

The USACOE does not issue itself a permit for civil works projects. Therefore, a Section 404(b)(1) analysis is prepared and included in the EIS/EIR Appendix E. Section 404(b)(1) addresses project related impacts to the waters of the United States and provides appropriate mitigation measures to minimize impacts. Section 230.10(a)(2) of the 404(b)(1) guidelines states that "an alternative is practicable if it is available and capable of being done after taking into consideration costs, existing technology and logistics in light of overall project purposes." A future maintenance plan is included in the EIS/EIR and impacts related to future maintenance are identified. Mitigation measures for future maintenance for the life of the project are included in

the EIS/EIR. Santa Barbara County must follow all of the environmental commitments identified in the EIS/EIR for future maintenance. In the future, if conditions change or new endangered and threatened species are listed, the local sponsor will need to coordinate with the appropriate resource agencies regarding new species introduced in the project area and comply with the environmental regulations.

R On December 20, 1999, Santa Barbara County submitted an application for a Section 404,USACOE Regulatory, permit with the Draft EIS/EIR. A General Permit could be renewable at intervals of 5 to 10 years under Section 404, or Regulatory Permit for Water Quality, or it could be waived under 404 (r) regulations. Future maintenance is an integral part of the project design, Impacts and mitigation measures for future maintenance are included in the Final EIS/EIR. The EIS/EIR would be submitted to Congress for authorization of the project construction and appropriation of funding.

Section 404(r) of the Clean Water Act, waives the requirement to obtain either the State Water Quality Certification or the 404 permit if:

"*The requirement to obtain Section 401 Water Quality Certification for the project construction is waived if information on the effects of the discharge of dredged or fill material into waters of the United States, including the Section 404 analysis, is included in an EIS/EIR submitted to Congress before Congress authorizes the project or appropriates funds for construction.*"

R On December 20, 1999, the USACOE and the Santa Barbara County Flood Control District submitted a request for a waiver from the Section 401 Water Quality Certification (Appendix E-1) for project construction and future maintenance. Future maintenance is a part of the project. By letter dated February 2, 2000, the California Regional Water Quality Control Board (CRWQCB) provided a waiver from the Section 401Water Quality Certification for the project construction and the future maintenance (Appendix E-1).

Federal agencies are exempt from Section 1601, but the Santa Barbara County is a participant in the project; therefore, Santa Barbara County will file a Section 1601 application for a streambed alteration agreement.

The revised Coastal Consistency Determination (CCD) can be found in Appendix D of the Final EIS/EIR. Prior to project construction, concurrence from the CCC would be obtained. Therefore, the project would comply with the Coastal Zone Management Act.

(3). Determination of Cumulative Effects of Disposal or Fill on the Aquatic Ecosystem: No such cumulative impacts are anticipated as a result of the proposed project.

Impacts: _ _ _N/A _ _X _INSIGNIF. _ _ _SIGNIF.

A0 Determination of Indirect Effects of Disposal or Fill on the Aquatic Ecosystem:

Impacts: _ _ _N/A _ _X _INSIGNIF. _ _ _SIGNIF.

III. FINDING OF COMPLIANCE. A review of the proposed project indicates that:

A. The discharge represents the least environmentally damaging practicable alternative and, if in a special aquatic site, the activity associated with the discharge must have direct access or proximity to, or be located in the aquatic ecosystem to fulfill its basic purpose.

___X__YES _____NO

B. The activity does not appear to: 1) violate applicable state water quality standards or effluent standards prohibited under Section 307 of the CWA; 2) jeopardize the existence of Federally listed endangered or threatened species or their habitat; and 3) violate requirements of any Federally designated marine sanctuary.

__X___YES ____NO

C. The activity will not cause or contribute to significant degradation of waters of the U.S. including adverse effects on human health, life stages of organisms dependent on the aquatic ecosystem, ecosystem diversity, productivity and stability, and recreational, aesthetic, and economic values.

___X__YES ____NO

D. Appropriate and practicable steps have been taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

____X__YES ____NO

E. Evaluation of Extent of Degradation of Waters of the United States. No significant, unmitigable impacts are expected.

F. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem. All practical steps have been taken to minimize impacts.

G. On the Basis of the Guidelines, the Proposed Disposal Site(s) for the Discharge of Dredged or Fill Material (specify which) is (select one):

_____ (1) Specified as complying with the requirements of these guidelines; or,

___X____ (2) Specified as complying with the requirements of these guidelines,

with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem; or,

_____ (3) Specified as failing to comply with the requirements of these guidelines.

APPENDIX - E -1

CORRESPONDENCE RELATED TO SECTION 404 AND 401 LOWER MISSION CREEK FLOOD CONTROL PROJECT SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

June 21, 2000

Office of the Chief
Environmental Resources Branch

Mr. Mike Higgins
Associate Water Resource Control Engineer
California Regional Water Quality Control Board
81 Higuera Street, Suite 200
San Luis Obispo, California 93401

Dear Mr. Higgins:

The U.S. Army Corps of Engineers (USACOE) requested a waiver from the Section 401 Water Quality Certification (WQC) for the construction and future maintenance of the Lower Mission Creek Flood Control Project, Santa Barbara, California in December 1999. The Draft EIS/EIR was provided for your review along with the Section 401 WQC waiver request. A waiver from the Section 401 WQC was issued by your office by letter dated February 2, 2000 for the proposed construction and future maintenance based on Section 404(r) regulation. Section 404(r) regulation states that:

"The requirement to obtain Section 401 Water quality Certification for the project construction is waived if information on the effects of the discharge of dredged or fill material into waters of the United States, including the Section 404 analysis, is included in an EIS/EIR submitted to Congress before Congress authorizes the project or appropriates funds for construction."

The USACOE coordinated the proposed project with you during preparation of the Draft EIS/EIR. The Feasibility Report with the EIS/EIR will be submitted to Congress for re-authorization and appropriation of funds for construction. Therefore, a Section 401 Water Quality Certification would be waived.

The project design has been modified since the release of the Draft EIS/EIR. These modifications include: extension of the bypass culvert from 540 to 830 feet in length and a change in size and orientation of a weir to control the movement of water into the culvert. There would not be any additional impacts to the water resources due to implementation of these modifications. All environmental mitigation and commitments identified in the EIS/EIR would be implemented during the project construction and future maintenance. The USACOE has performed additional analysis for hydrology of the stream with the project and without the project, prepared detailed mitigation monitoring plan for the planted vegetation and significant resources located within the project area. The USACOE has revised Biological

Assessments (BA) for tidewater gobies and steelhead to incorporate revised project related information. The USACOE has submitted revised BA to both the National Marine Fisheries Service and the US Fish and Wildlife Service. The Corps is providing several relevant documents: Mitigation Monitoring Plan, Biological Assessment for tidewater gobies; Revised Project Description; Hydraulics/Engineering analysis; Biological Assessment for steelhead (*Oncohrynchus mykiss*), the project plans; and supporting plans and drawings for your information.

If you have any questions regarding the proposed project, please contact Ms. Joy Jaiswal of my staff at (213) 452-3871, or Dr. John Moeur at (213) 452-3874.

Thank you for issuing a waiver from the Section 401 Water Quality Certification for the proposed project construction and the future maintenance.

Sincerely,

Robert E. Koplin, P.E
Chief, Planning Division

Enclosures

California Regional Water Quality Control Board
Central Coast Region

Winston H. Hickox
Secretary for Environmental Protection

Internet Address: http://www.swrcb.ca.gov/~rwqcb3
81 Higuera Street, Suite 200, San Luis Obispo, California 93401-5427
Phone (805) 549-3147 • FAX (805) 543-0397

Gray Davis
Governor

February 2, 2000

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Environmental Resources Branch
Los Angeles District, Corps of Engineers
Department of the Army
Post Office Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Koplin:

WAIVER OF WASTE DISCHARGE REQUIREMENTS AND WAIVER OF WATER QUALITY CERTIFICATION, MAINTENANCE OF FLOOD CONTROL PROJECT, LOWER MISSION CREEK, SANTA BARBARA COUNTY

This letter responds to your December 20, 1999 request for Clean Water Act Section 401 certification that the proposed project described below will not violate State water quality standards:

Project Description:	Maintain project dedicated to providing flood control and to enhancing habitat
Receiving water body:	Lower Mission Creek
Filled or excavated area	Temporary disturbance of 1.2 miles of creek (approximately one acre)
Federal Permit:	This is an Army Corps project.
State Hydrologic Number:	315 (South Coast)
Mitigation:	None required

We hereby waive waste discharge requirements, pursuant to the waiver policy specified in Appendix A-23 of the *Water Quality Control Plan, Central Coast Basin*, adopted on November 17, 1989.

Pursuant to California Code of Regulations Section 3857, we will take no further action on your application. This letter is equivalent to a waiver of water quality certification. No further action on your part is required, unless substantial project changes could result in unmitigated adverse effects on water quality. Pursuant to Section 13260 of the Water Code, you must report such project changes to this Board. Subsequently, we may draft Waste Discharge Requirements for Board consideration.

If you have any questions, please call **Michael Higgins at (805) 542-4649 or e-mail him at mhiggins@rb3.swrcb.ca.gov.**

Sincerely,

for: Roger W. Briggs
Executive Officer

cc: U.S. Army Corps of Engineers, Ventura District
Marla Lafer, Division of Water Quality, State Water Resources Control Board
U.S. EPA, Region 9
bc: ch;

mlh/beach club road 124; Task: 10701; File: wq cert program

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

December 20, 1999

Office of the Chief
Environmental Resources Branch

Mr. Mike Higgins
Associate Water Resource Control Engineer
California Regional Water Quality Control Board
81 Higuera Street, Suite 200
San Luis Obispo, California 93401

Dear Mr. Higgins:

The U.S. Army Corps of Engineers (USACOE) requests a waiver from the Section 401 Water Quality Certification (WQC) for the construction of the Lower Mission Creek Flood Control Project, Santa Barbara, California. The future maintenance is an integral part of the project features. Environmental analysis for each resource has been addressed for the life of the project in the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). Therefore, no separate CEQA document would be required for future maintenance. Santa Barbara County would require a Section 401 Water Quality Certification for the future maintenance. Herewith, Santa Barbara County requests a Section 401 Water Quality Certification for future maintenance. A copy of the Draft Feasibility Report and Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) is also provided for detailed analysis of each environmental resource.

The study is limited to the final 1.2 miles of the creek, between Canon Perdido Street and Cabrillo Boulevard This study does not extend to the lagoon. The proposed project would provide 3400 cubic feet per second (cfs) of capacity and approximately a 20-year level of flood protection.

The USACOE has already initiated coordination with you regarding a waiver from the Section 401 WQC. Information related to Section 404(r) also has been provided. Section 404(r) regulation states that:

"The requirement to obtain Section 401 Water quality Certification for the project construction is waived if information on the effects of the discharge of dredged or fill material into waters of the United States, including the Section 404 analysis, is included in an EIS/EIR submitted to Congress before Congress authorizes the project or appropriates funds for construction."

The Feasibility Report with the EIS/EIR will be submitted to Congress for re-authorization and appropriation of funds for construction. Therefore, a Section 401 Water Quality Certification would be waived.

Project construction and future maintenance could result in temporary increases in turbidity, but would not exceed levels occurring during high flows or storm events. Mitigation measures would reduce impacts to below a level of significance. Mitigation measures include; construction during the dry season (April-November) when water flow is minimum, implementing "Best Management Practices" as required by the NPDES permit, monitoring to ensure turbidity levels remain within an acceptable range and others as described in Section 7 of the Draft EIS/EIR.

The USACOE has performed a modified Habitat Evaluation Procedure (HEP) analysis (Appendix C-Draft EIS/EIR) to quantify existing biological resources, and to analyze project related impacts to biological resources. Two Biological Assessments for the federally listed species, tidewater gobies (Appendix A-Draft EIS/EIR) were prepared to comply with the endangered species act, which identifies impacts to the federally listed species. The U.S. Fish and Wildlife Service Coordination Act Report (Appendix B-Draft EIS/EIR) would assist you in evaluating project related impacts to biological resources.

If you have any questions regarding the proposed project, please contact Ms. Joy Jaiswal of my staff at (213) 452-3871, or Dr. John Moeur at (213) 452-3874. If you have any questions on the Draft Feasibility Report, please contact Mr. Ed Demesa, (213) 452- 3796.

Your timely response of this request would be greatly appreciated.

Sincerely,

Thomas D. Fayram
Public Works Deputy Director

Sincerely,

Robert E. Koplin, P.E
Chief, Planning Division

Enclosure

Santa Barbara County Flood Control & Water Conservation District and Water Agency

123 E. Anapamu Street, Santa Barbara, California 93101
(805) 568-3440 Fax: (805) 568-3434
Web: http://www.publicworkssb.org/

Phillip M. Demery
Public Works Director

Thomas D. Fayram
Deputy Public Works Director

December 20, 1999

U.S. Army Corps of Engineers
Regulatory Branch
ATT: Mr. Jim Mace
2151 Alessandro Drive, Suite 255
Ventura, California 93001

Dear Mr. Mace:

The Santa Barbara County Flood control District requests a 404 permit for annual routine maintenance activities on the Lower Mission Creek Flood Control Project. The Lower Mission Creek Project is a Federal project with the City and County Flood Control District acting as local co-sponsors. The Corps has closely coordinated this project with Corps Regulatory and all of the other State and Federal Regulatory Agencies (CA Fish & Game, USFWS, NMFS, EPA, etc.). As such, Regulatory Staff, as well as staff from all of the interested Agencies have already had significant input into the project and presumably have had their comments incorporated. A 404 permit is not required for the construction of the Lower Mission Creek Flood Control Project as it is a Federal Project and is exempt from such permitting, however, a 404 (b)(1) analysis was completed and is included in the draft EIS/EIR. You should have received a copy of the EIS/EIR for your LA District Offices.

To ensure and maintain its design function and form, some maintenance to preserve the design capacity of the channel would be needed on a regular basis. The Corps has proposed that any areas where sediment deposition and/or vegetation growth causes a reduction of 15% of the channel capacity, channel maintenance would be performed to maintain the capacity of the project reach. Future maintenance would also include maintenance of the structures such as cleaning of oxbow by-pass culverts, repair of vertical concrete walls and riprap, and maintenance of planted vegetation. It is estimated that the average frequency of sediment removal would be at an interval as often as once a year. However, when several low-flow years occur sequentially, sediment removal might occur every two to three or more years. Flood flows, debris accumulation and removal would continue to impact channel vegetation and aquatic resources. Over time, pools and riffles that provide aquatic habitat would reestablish in the channel. Impact analysis for future maintenance is included in each resource and is discussed in the EIS/EIR. Impacts related to maintenance activities are addressed in Chapters 6 through19. Mitigation measures for future operation and maintenance for the life of the project are included in the EIS/EIR.

Routine channel maintenance would not occur between December and March, to avoid impacts to

steelhead and other sensitive species, when significant amounts of water are flowing in the channel.

The County, as the local sponsor, has insisted, and the Corps has assured, that the Public Review of this 404 Maintenance Application will be coincident with the public review of the project itself. Please forward the notice as soon as you make it available.

If you have any questions regarding the proposed project, please contact Ms. Joy Jaiswal the Corps Environmental Manager, at (213) 452-3871 or myself at (805) 568-3435. Your timely response of this request would be greatly appreciated.

Sincerely,

Thomas D. Fayram
Deputy Public Works Director
Water Resources Division

CC: Pat Kelley – City Engineer, City of Santa Barbara
✓Ed Demesa – Project Manager, USACE
Dave Castenon – USACOE Regulatory - Ventura

PUBLIC NOTICE

US Army Corps of Engineers®

APPLICATION FOR PERMIT

LOS ANGELES DISTRICT

Public Notice/Application No.:	200000660-JEM
Comment Period:	**February 25, 2000** through **March 26, 2000**
Project Manager:	James E. Mace (805) 641-0301

Applicant

Santa Barbara County Flood Control & Water Conservation District
123 East Anapamu Street
Santa Barbara, California 93101-2025

Contact

Thomas D. Fayram
Deputy Public Works Director
Water Resources Division

Location

The project is located in lower Mission Creek in the City of Santa Barbara, Santa Barbara County, California. Please see attached location map.

Activity

To conduct annual routine maintenance activities on the Lower Mission Creek Flood Control Project. For more information see page 3 of this notice.

Interested parties are hereby notified that an application has been received for a Department of the Army permit for the activity described herein and shown on the attached drawing(s). Interested parties are invited to provide their views on the proposed work, which will become a part of the record and will be considered in the decision. This permit will be issued or denied under Section 404 of the Clean Water Act of 1972 (33 U.S.C. 1344). Comments should be mailed to:

U.S. Army Corps of Engineers
Regulatory Branch Field Office
ATTN: CESPL-CO-RV-200000660-JEM
2151 Alessandro, Suite 255
Ventura, CA 93001

Alternatively, comments can be sent electronically to: **jmace@spl.usace.army.mil**

Evaluation Factors

The decision whether to issue a permit will be based on an evaluation of the probable impact including cumulative impacts of the proposed activity on the public interest. That decision will reflect the national concern for both protection and utilization of important resources. The benefit which reasonably may be expected to accrue from the proposal must be balanced against its reasonably foreseeable detriments. All factors which may be relevant to the proposal will be considered including the cumulative effects thereof. Factors that will be considered include conservation, economics, aesthetics, general environmental concerns, wetlands, cultural values, fish and wildlife values, flood hazards, flood plain values, land use, navigation, shoreline erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food production and, in general, the needs and welfare of the people. In addition, if the proposal would discharge dredged or fill material, the evaluation of the activity will include application of the EPA Guidelines (40 CFR 230) as required by Section 404 (b)(1) of the Clean Water Act.

The Corps of Engineers is soliciting comments from the public; Federal, state, and local agencies and officials; Indian tribes; and other interested parties in order to consider and evaluate the impacts of this proposed activity. Any comments received will be considered by the Corps of Engineers to determine whether to issue, modify, condition or deny a permit for this proposal. To make this decision, comments are used to assess impacts on endangered species, historic properties, water quality, general environmental effects, and the other public interest factors listed above. Comments are used in the preparation of an Environmental Assessment and/or an Environmental Impact Statement pursuant to the National Environmental Policy Act. Comments are also used to determine the need for a public hearing and to determine the overall public interest of the proposed activity.

'reliminarv Review of Selected Factors

EIS Determination- A draft EIS has already been prepared for both construction and maintenance of the flood control facility. The draft EIS/EIR for the Lower Mission Creek Flood Control and Feasibility Study was released by the Corps of Engineers in December, 1999.

Water Quality- The applicant is required to obtain water quality certification, under Section 401 of the Clean Water Act, from the California Regional Water Quality Control Board. Section 401 requires that any applicant for an individual Section 404 permit provide proof of water quality certification to the Corps of Engineers prior to permit issuance. For any proposed activity on Tribal land that is subject to Section 404 jurisdiction, the applicant will be required to obtain water quality certification from the U.S. Environmental Protection Agency. A waiver of waste discharge requirements and waiver of water quality certification from the California Regional Water Quality Control Board were obtained on February 2, 2000.

Coastal Zone Management- The applicant has certified that the proposed activity complies with and will be conducted in a manner that is consistent with the approved State Coastal Zone Management Program. The District Engineer hereby requests the California Coastal Commission's concurrence or nonconcurrence.

Cultural Resources- Several properties along mission creek are listed in the latest version of the National Register of Historic Places (please see draft EIS/EIR Lower Mission Creek Flood Control and Feasibility Study, December, 1999). The Corps is resolving these issues through the EIS/EIR process.

Endangered Species- The proposed activity may effect two federally endangered fish species, the tidewater goby (*Eucyclogobius newberryi*) and steelhead (*Oncorhyncus mykiss*). Therefore, formal

consultation under Section 7 of the Endangered Species Act is required and a Corps permit will not be issued until the consultation has been completed.

Public Hearing- Any person may request, in writing, within the comment period specified in this notice, that a public hearing be held to consider this application. Requests for public hearing shall state with particularity the reasons for holding a public hearing.

Proposed Activity for Which a Permit is Required

To conduct routine flood control maintenance activities that involve a discharge of dredged or fill material into Corps jurisdictional areas in the Lower Mission Creek Flood Control Project. Routine maintenance activities for this project include streambed maintenance (brushing, spraying, and shaping/desilting of the earthen channel); maintenance of the concrete channel walls and maintenance/stabilization of the channel banks; box culvert maintenance; interior drainage maintenance (storm drains, pipes, etc.); and habitat expansion zone maintenance. *Of these activities, a Section 404 of the Clean Water Act permit is typically not required for brushing and spraying the earthen channel, maintenance of the interior drainage system, or maintenance associated with re-planting failed native trees in the habitat expansion zones.*

The following is a summary of the regulated maintenance activities:

Streambed Maintenance--Shaping/Desilting

Maintenance of the streambed would address vegetation control, desilting and shaping.

Vegetation control would be accomplished by either brushing, spraying, or clearing. Clearing would be done using mechanical equipment, such as a dozer. Partial removal of vegetation would occur yearly. The removal would follow a mosaic pattern, wherein one half of the streambed would be cleared. The remaining half would then be cleared the following year. The alternate clearing process would be repeated for subsequent years.

Desilting is necessary where sedimentation significantly reduces the cross-section of a creek. Desilting is typically done with a dozer or loader working in the bottom of the channel pushing the accumulated sediment to an area where the material can be loaded directly into trucks driving on the channel bottom or to an area where a crane can access the material which is then loaded into trucks and hauled to a suitable disposal site. It is sometimes possible for lesser amounts of sediment to be placed on the channel banks (e.g. for bank maintenance).

Channel shaping may be desirable to create a low flow channel with aquatic habitat features that also provides for efficient sediment transport. Shaping is typically done with a dozer working on the channel bottom. The dozer creates a 10'-15' wide pilot channel with material placeded along the sides to a height of approximately 2'. Depressions are established within the pilot channel in areas where pools are expected to form to provide refuge for aquatic species. The pilot channel consolidates the lower flows so that broad shallow flows are limited. This provides for efficient sediment transport in lower flows reducing the frequency of desilting.

Channel Wall Maintenance

Channel wall maintenance is necessary when there is cracking, chipping, or breaking of the concrete to an extent which might affect the stability of the wall or its watertightness, or loss of or damage to backfill behind the wall. Normally, eroded concrete is repaired by sandblasting the area and matching the decorative treatment with the appropriate material.

Channel wall maintenance also includes cleaning weep holes and debris that may accumulate in front of weep holes, bridge piers, and splitter walls.

Channel Bank Maintenance

Channel bank maintenance is necessary when the earthen fill over the rip-rap is damaged or missing such that it does not encourage understory growth. In worst cases where >250 square feet of the bank are severely damaged by scour, erosion, or other means, replacement is often necessary through the use of filter fabric, rip-rap, earthen fill, and plants.

Channel bank maintenance also includes keeping access ramps clear of debris and obstructions and planted with native grass. Obstructive debris on channel banks is typically removed or chopped and left in place prior to the rainy season. Damage to fencing and rails along the top of the channel banks is typically repaired as soon as possible. Non-native vegetation is typically controlled with herbicide and/or removed.

Box Culvert Maintenance

Box culvert maintenance is typically necessary when there is cracking, chipping, or breaking of the concrete to an extent which might affect the stability of the culvert or its watertightness, or sufficient sediment and/or obstructions have accumulated within the culvert to significantly impair its design flow. Box culvert maintenance also includes cleaning weep holes and debris that may accumulate in front of weep holes.

Sediment and/or obstruction removal is usually conducted by pushing the material to the inlet and/or outlet where it can be removed with a crane or excavator.

Additional Project Information

The construction of the Lower Mission Creek Project is to be conducted by the Corps of Engineers, and as such, does not require a Section 404 of the Clean Water Act permit (CWA). However, a 404(b)(1) analysis of the construction was completed and is included in the draft EIS/EIR.

Upon completion of construction, the responsibility for maintenance of the project will be transferred to the local sponsor (Santa Barbara County Flood Control and Water Conservation District and Water Agency), which will then be required to have a Section 404 CWA permit for activities that will involve a discharge of dredged or fill material into jurisdictional waters of the United States.

The proposed permit would authorize maintenance activities for twenty years, and would be subject to review and a Notice to Proceed from the Corps after ten years. The project, as proposed in the draft EIS/EIR, is self-mitigating for both construction and maintenance activities.

Proposed Special Conditions

1. The Permittee shall abide by all Special Conditions and/or Terms and Conditions of any Incidental Take Statement as stipulated for compliance with any Section 7 of the Endangered Species Act (ESA) process.

2. The Permittee shall obtain and comply with federal consistency certification concurrence, or waiver thereof, from the California Coastal Commission (CCC).

3. As outlined in the Environmental Commitments in the EIS/EIR, the growth rates of all plantings in association with mitigation for the maintenance activities shall be monitored for the first five years. Reports describing the mitigation success, or lack of, shall be submitted to the Corps Regulatory Branch annually for the first five years. If the Corps determines the shrubs and trees do not meet predetermined

growth and survival rates, the Permittee may be required to re-plant, increase irrigation and/or fertilization, or take the appropriate remedial measures. Only native plants shall be used for revegetation.

4. The Permittee shall inform and coordinate with the California Department of Transportation concerning any maintenance activities that occur at or in the vicinity of any bridge or other structure for which the Department of Transportation is responsible.

5. The Permittee shall conduct annual spring inspections of the project site in conjugation with the District's Annual Maintenance Plan (DAMP). Regulated maintenance needs for the project shall be described in the DAMP. Based on the results of inspections and project monitoring, performance standards shall be developed to better determine conditions under which maintenance needs to be conducted. Performance standards for conveyance, maintenance, habitat functions and values, and aesthetics shall be established and described in the DAMP. Future maintenance shall consider pre-determined performance standards for these issues prior to development of the DAMPs.

6. The Permittee shall conduct wildlife surveys in conjunction with the spring inspections as well as immediately prior to maintenance activities. If applicable, the surveys shall be conducted at the most appropriate time of year to determine what, if any, sensitive species would likely be affected by maintenance activities. If available, U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and California Department of Fish and Game (CDFG) approved survey protocol/methods shall be used for sensitive species to the maximum extent practicable.

7. The Permitee's pre-maintenance wildlife surveys shall be provided to the Corps annually. Documentation shall include location and description of area surveyed, time and date of survey, all survey methods used, name of biologist completing the surveys, and all sensitive species observed during the survey. If trout are observed during the survey, the documentation shall include estimated abundance, developmental stage (i.e. parr, smolt, adult), size, and habitat use and behavioral observations of all trout observed. Information regarding observed trout shall be forwarded to both CDFG and NMFS.

8. If any previously undiscovered federally listed endangered or threatened species or species proposed for listing, or proposed/critical habitat areas, are identified as potentially being affected during any pre-maintenance wildlife survey, the maintenance shall not proceed until either formal or informal consultation under Section 7 of the ESA has been completed with either USFWS or NMFS. In instances where an endangered or threatened species, or species proposed for listing, is found, the Permittee shall forward a copy of the findings to the Corps, USFWS, CDFG, and NMFS.

9. No discharge of dredged or fill material may consist of unsuitable material (e.g. trash, debris, etc.), material discharged must be free of toxic pollutants in toxic amounts (see Section 307 of the CWA), and discharges must not permanently restrict or impede the passage of normal or expected high flows.

For additional information please call James E. Mace of my staff at (805) 641-0301. This public notice is issued by the Chief, Regulatory Branch.

APPENDIX - F

WATER QUALITY AND SEDIMENT SAMPLING ANALYSIS TABLES LOWER MISSION CREEK FLOOD CONTROL PROJECT SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

Table 1
Constituents/Analytical Methods

Constituent (Analyte)	Analytical Method for Sediments	Analytical Method for Water
Total Recoverable Oil and Grease	EPA 413.2	EPA 413.2 (I.R)
Total Recoverable Petroleum Hydrocarbons	EPA 418.1	EPA 418.1(I.R.) W/ Clean Up
Metals and Non Metals		
Arsenic	EPA 6010	EPA 200.7
Cadmium	EPA 6010	EPA 200.7
Chromium	EPA 6010	EPA 200.7
Copper	EPA 6010	EPA 200.7
Lead	EPA 6010	EPA 200.7
Mercury	EPA 7471	EPA 7470
Nickel	EPA 6010	EPA 200.7
Selenium	EPA 6010	EPA 200.7
Silver	EPA 6010	EPA 200.7
Zinc	EPA 6010	EPA 200.7
Physical and Conventional Tests		
Percent Moisature (%)	EPA 160.3	EPA 376.2
Soluable Sulfide	EPA 9030	EPA 415.1
Total Organic Carbon	EPA 9060A Mod.	EPA
Total Sulfide	EPA 9030	EPA 376.2
Organics	EPA GC/FPD	EPA GC/FPD
Tributyltin		

Table 1
Constituents/Analytical Methods
(Continued)

Constituent (Analyte)	Analytical Method for Sediments	Analytical Method for Water
Organochlorine Pesticides	EPA 3550/8081A	EPA 3550/8081A
Aldrin		
alpha-BHC		
beta-BHC		
delta-BHC		
gamma-BHC		
Chlordane		
4,4'-DDD		
4,4'-DDD		
4,4'-DDD		
Dieldrin		
Endosulfan I		
Endosulfan II		
Endosulfan Sulfate		
Endrin		
Endrin aldehyde		
Heptachlor		
Heptachlor epoxide		
Methoxychlor		
Toxaphene		
Polychlorinated Biphenyls	EPA 3550/8082	EPA 3550/8082
Aroclor 1016		
Aroclor 1221		
Aroclor 1232		
Aroclor 1242		
Aroclor 1248		
Aroclor 1254		
Aroclor 1260		

Table 1
Constituents/Analytical Methods
(Continued)

Constituent (Analyte)	Analytical Method for Sediments	Analytical Method for Water
Polynuclear Aromatic Hydrocarbons	EPA 3550/8310	EPA 3510/8310
Acenaphthene		
Acenaphthyene		
Anthracene		
Benz(a)anthracene		
Benzo(a) pyrene		
Benzo(b)fluoranthene		
Benzo(g,h,i)perylene		
Benzo(k)fluoranthene		
Chrysene		
Dibenz(a,h)anthracene		
Fluoranthene		
Fluorene		
Ideno (1,2,3-cd)pyrene		
Naphthalene		
Phenanthrene		
Pyrene		

Table 3
Water Analyses
Location 1

Constituent (Analyte)	Analytical Method	Reporting Limit mg/L (ppm)	Sample No. 1 Result mg/L (ppm)	Sample No. 2 Result mg/L (ppm)
Total Recoverable Oil and Grease	EPA 413.2 (I.R)	1.0	N. D.	1
Total Recoverable Petroleum Hydrocarbons	EPA 418.1(I.R.) W/ Clean Up	1.0	N. D.	1
Metals and Non Metals				
Arsenic	EPA 200.7	0.0050	N. D.	N.D.
Cadmium	EPA 200.7	0.0050	N. D.	N.D.
Chromium	EPA 200.7	0.0050	N. D.	N.D.
Copper	EPA 200.7	0.010	N. D.	N.D.
Lead	EPA 200.7	0.0050	0.0090	N.D.
Mercury	EPA 7470	0.0002	N. D.	N.D.
Nickel	EPA 200.7	0.010	N. D.	N.D.
Selenium	EPA 200.7	0.0050	N. D.	N.D.
Silver	EPA 200.7	0.010	N. D.	N.D.
Zinc	EPA 200.7	0.020	N. D.	N.D.
Physical and Conventional Tests				
Soluable Sulfide	EPA 376.2	0.10	N. D.	N.D.
Total Organic Carbon	EPA 415.1	1.0	4.3	12
Total Sulfide	EPA 376.2	0.1	N. D	N.D.
Organics	EPA GC/FPD	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)
Tributyltin		2.0	3.7	N.D.

Table 3
(Continued)
Water Analyses
Location 1

Constituent (Analyte)	Analytical Method	Reporting Limit µg/L (ppb)	Sample No.1 Result µg/L (ppb)	Sample No.2 Result µg/L (ppb)
Organochlorine Pesticides	**EPA 3550/8081A**			
Aldrin		0.10	N. D.	N. D.
alpha-BHC		0.10	N. D.	N. D.
beta-BHC		0.10	N. D.	N. D.
delta-BHC		0.25	N. D.	N. D.
gamma-BHC		0.10	N. D.	N. D.
Chlordane		2.0	N. D.	N. D.
4,4'-DDD		0.10	N. D.	N. D.
4,4'-DDD		0.10	N. D.	N. D.
4,4'-DDD		0.10	N. D.	N. D.
Dieldrin		0.10	N. D.	N. D.
Endosulfan I		0.10	N. D.	N. D.
Endosulfan II		0.10	N. D.	N. D.
Endosulfan Sulfate		0.50	N. D.	N. D.
Endrin		0.10	N. D.	N. D.
Endrin aldehyde		0.10	N. D.	N. D.
Heptachlor		0.10	N. D.	N. D.
Heptachlor epoxide		0.10	N. D.	N. D.
Methoxychlor		0.10	N. D.	N. D.
Toxaphene		4.0	N. D.	N. D.
Polychlorinated Biphenyls	**EPA 3510/8082**			
Aroclor 1016		1.0	N. D.	N. D.
Aroclor 1221		1.0	N. D.	N. D.
Aroclor 1232		1.0	N. D.	N. D.
Aroclor 1242		1.0	N. D.	N. D.
Aroclor 1248		1.0	N. D.	N. D.
Aroclor 1254		1.0	N. D.	N. D.
Aroclor 1260		1.0	N. D.	N. D.

Table 3
(Continued)
Water Analyses
Location 1

Constituent (Analyte)	Analytical Method	Reporting Limit µg/L (ppb)	Sample No. 1 Result µg/L (ppb)	Sample No. 2 Result µg/L (ppb)
Polynuclear Aromatic Hydrocarbons	EPA 3510/8310			
Acenaphthene		0.50	N. D.	2
Acenaphthyene		0.50	N. D.	N. D.
Anthracene		0.020	N. D.	N. D.
Benz(a)anthracene		0.020	N. D.	0.055
Benzo(a) pyrene		0.020	N. D.	N. D.
Benzo(b)fluoranthene		0.020	N. D.	N. D.
Benzo(g,h,i)perylene		0.050	N. D.	N. D.
Benzo(k)fluoranthene		0.020	N. D.	N. D.
Chrysene		0.050	N. D.	N. D.
Dibenz(a,h)anthracene		0.050	N. D.	N. D.
Fluoranthene		0.050	N. D.	N. D.
Fluorene		0.50	N. D.	N. D.
Ideno(1,2,3-cd)pyrene		0.20	N. D.	N. D.
Naphthalene		0.50	N. D.	N. D.
Phenanthrene		0.050	N. D.	0.39
Pyrene		0.050	N. D.	N. D.

Table 4
Water Analyses
Location 2

Constituent (Analyte)	Analytical Method	Reporting Limit mg/L (ppm)	Sample Result No. 1 mg/L (ppm)	Sample Result No. 2 mg/L (ppm)
Total Recoverable Oil and Grease	EPA 413.2 (I.R)	1.0	1	N. D.
Total Recoverable Petroleum Hydrocarbons	EPA 418.1(I.R.) W/ Clean Up	1.0	1	N. D.
Metals and Non Metals				
Arsenic	EPA 200.7	0.0050	N. D.	N. D.
Cadmium	EPA 200.7	0.0050	N. D.	N. D.
Chromium	EPA 200.7	0.0050	N. D.	N. D.
Copper	EPA 200.7	0.010	N. D.	N. D.
Lead	EPA 200.7	0.0050	N. D.	N. D.
Mercury	EPA 7470	0.00020	N. D.	N. D.
Nickel	EPA 200.7	0.010	N. D.	N. D.
Selenium	EPA 200.7	0.0050	N. D.	N. D.
Silver	EPA 200.7	0.010	N. D.	N. D.
Zinc	EPA 200.7	0.020	N. D.	N. D.
Physical and Conventional Tests				
Soluable Sulfide	EPA 376.2	.10	N. D.	N. D.
Total Organic Carbon	EPA 415.1	1.0	3.9	17
Total Sulfide	EPA 376.2	.10	N. D	N. D
Organics	EPA GC/FPD	ng/L (ppt)	ng/L (ppt)	ng/L (ppt)
Tributyltin		2.0	4.2	N/A

Table 4
(Continued)
Water Analyses
Location 2

Constituent (Analyte)	Analytical Method	Reporting Limit µg/L (ppb)	Sample No. 1 Result µg/L (ppb)	Sample No. 2 Result µg/L (ppb)
Organochlorine Pesticides	**EPA 3550/8081A**			
Aldrin		0.10	N. D.	N. D.
alpha-BHC		0.10	N. D.	N. D.
beta-BHC		0.10	N. D.	N. D.
delta-BHC		0.25	N. D.	N. D.
gamma-BHC		0.10	N. D.	N. D.
Chlordane		2.0	N. D.	N. D.
4,4'-DDD		0.10	N. D.	N. D.
4,4'-DDD		0.10	N. D.	N. D.
4,4'-DDD		0.10	N. D.	N. D.
Dieldrin		0.10	N. D.	N. D.
Endosulfan I		0.10	N. D.	N. D.
Endosulfan II		0.10	N. D.	N. D.
Endosulfan Sulfate		0.50	N. D.	N. D.
Endrin		0.10	N. D.	N. D.
Endrin aldehyde		0.10	N. D.	N. D.
Heptachlor		0.10	N. D.	N. D.
Heptachlor epoxide		0.10	N. D.	N. D.
Methoxychlor		0.10	N. D.	N. D.
Toxaphene		4.0	N. D.	N. D.
Polychlorinated Biphenyls	**EPA 3510/8082**			
Aroclor 1016		1.0	N. D.	N. D.
Aroclor 1221		1.0	N. D.	N. D.
Aroclor 1232		1.0	N. D.	N. D.
Aroclor 1242		1.0	N. D.	N. D.
Aroclor 1248		1.0	N. D.	N. D.
Aroclor 1254		1.0	N. D.	N. D.
Aroclor 1260		1.0	N. D.	N. D.

Table 4
(Continued)
Water Analyses
Location 2

Constituent (Analyte)	Analytical Method	Reporting Limit µg/L (ppb)	Sample No. 1 Result µg/L (ppb)	Sample No. 2 Result µg/L (ppb)
Polynuclear Aromatic Hydrocarbons	**EPA 3510/8310**			
Acenaphthene		0.50	N. D.	N. D.
Acenaphthyene		0.50	N. D.	N. D.
Anthracene		0.020	N. D.	N. D.
Benz(a)anthracene		0.020	N. D.	N. D.
Benzo(a) pyrene		0.020	N. D.	N. D.
Benzo(b)fluoranthene		0.020	N. D.	N. D.
Benzo(g,h,i)perylene		0.050	N. D.	N. D.
Benzo(k)fluoranthene		0.020	N. D.	N. D.
Chrysene		0.050	N. D.	N. D.
Dibenz(a,h)anthracene		0.050	N. D.	N. D.
Fluoranthene		0.050	N. D.	N. D.
Fluorene		0.50	N. D.	N. D.
Ideno(1,2,3-cd)pyrene		0.20	N. D.	N. D.
Naphthalene		0.50	N. D.	N. D.
Phenanthrene		0.050	N. D.	N. D.
Pyrene		0.050	N. D.	N. D.

Table 5
Water Analyses
Location 3

Constituent (Analyte)	Analytical Method	Reporting Limit mg/L (ppm)	Sample No. 1 Result mg/L (ppm)	Sample No. 2 Result mg/L (ppm)
Total Recoverable Oil and Grease	EPA 413.2 (I.R)	1.0	N. D.	1
Total Recoverable Petroleum Hydrocarbons	EPA 418.1(I.R.) W/ Clean Up	1.0	N. D.	1
Metals and Non Metals				
Arsenic	EPA 200.7	0.0050	N. D.	N. D.
Cadmium	EPA 200.7	0.0050	N. D.	N. D.
Chromium	EPA 200.7	0.0050	N. D.	N. D.
Copper	EPA 200.7	0.010	N. D.	N. D.
Lead	EPA 200.7	0.0050	N. D.	N. D.
Mercury	EPA 7470	0.00020	N. D.	N. D.
Nickel	EPA 200.7	0.010	N. D.	N. D.
Selenium	EPA 200.7	0.0050	N. D.	N. D.
Silver	EPA 200.7	0.010	N. D.	N. D.
Zinc	EPA 200.7	0.020	N. D.	N. D.
Physical and Conventional Tests				
Soluable Sulfide	EPA 376.2	.10	N. D.	N. D.
Total Organic Carbon	EPA 415.1	1.0	3.9	11
Total Sulfide	EPA 376.2	.10	N. D	N. D
Organics	**EPA GC/FPD**	ηg/L (ppt)	ηg/L (ppt)	ηg/L (ppt)
Tributyltin		2.0	N/A	N/A

Table 5
(Continued)
Water Analyses
Location 3

Constituent (Analyte)	Analytical Method	Reporting Limit µg/L (ppb)	Sample No. 1 Result µg/L (ppb)	Sample No. 2 Result µg/L (ppb)
Organochlorine Pesticides	**EPA 3550/8081A**			
Aldrin		0.10	N. D.	N. D.
alpha-BHC		0.10	N. D.	N. D.
beta-BHC		0.10	N. D.	N. D.
delta-BHC		0.25	N. D.	N. D.
gamma-BHC		0.10	N. D.	N. D.
Chlordane		2.0	N. D.	N. D.
4,4'-DDD		0.10	N. D.	N. D.
4,4'-DDD		0.10	N. D.	N. D.
4,4'-DDD		0.10	N. D.	N. D.
Dieldrin		0.10	N. D.	N. D.
Endosulfan I		0.10	N. D.	N. D.
Endosulfan II		0.10	N. D.	N. D.
Endosulfan Sulfate		0.50	N. D.	N. D.
Endrin		0.10	N. D.	N. D.
Endrin aldehyde		0.10	N. D.	N. D.
Heptachlor		0.10	N. D.	N. D.
Heptachlor epoxide		0.10	N. D.	N. D.
Methoxychlor		0.10	N. D.	N. D.
Toxaphene		4.0	N. D.	N. D.
Polychlorinated Biphenyls	**EPA 3510/8082**			
Aroclor 1016		1.0	N. D.	N. D.
Aroclor 1221		1.0	N. D.	N. D.
Aroclor 1232		1.0	N. D.	N. D.
Aroclor 1242		1.0	N. D.	N. D.
Aroclor 1248		1.0	N. D.	N. D.
Aroclor 1254		1.0	N. D.	N. D.
Aroclor 1260		1.0	N. D.	N. D.

Table 5
(Continued)
Water Analyses
Location 3

Constituent (Analyte)	Analytical Method	Reporting Limit µg/L (ppb)	Sample No. 1 Result µg/L (ppb)	Sample No. 2 Result µg/L (ppb)
Polynuclear Aromatic Hydrocarbons	**EPA 3510/8310**			
Acenaphthene		0.50	N. D.	0.51
Acenaphthyene		0.50	N. D.	N. D.
Anthracene		0.020	N. D.	N. D.
Benz(a)anthracene		0.020	N. D.	N. D.
Benzo(a) pyrene		0.020	N. D.	N. D.
Benzo(b)fluoranthene		0.020	N. D.	N. D.
Benzo(g,h,i)perylene		0.050	N. D.	N. D.
Benzo(k)fluoranthene		0.020	N. D.	N. D.
Chrysene		0.050	N. D.	N. D.
Dibenz(a,h)anthracene		0.050	N. D.	N. D.
Fluoranthene		0.050	N. D.	N. D.
Fluorene		0.50	N. D.	N. D.
Ideno(1,2,3-cd)pyrene		0.20	N. D.	N. D.
Naphthalene		0.50	N. D.	N. D.
Phenanthrene		0.050	N. D.	0.074
Pyrene		0.050	N. D.	N. D.

Table 6
Sediment Analyses
Location S1

Constituent (Analyte)	Analytical Method	Reporting Limit mg/Kg (ppm)	Sample Result mg/Kg (ppm)
Total Recoverable Oil and Grease	EPA 413.2 (I.R.)	5.0	75
Total Recoverable Petroleum Hydrocarbons	EPA 418.1(IR.) W/Clean Up	5.0	59
Metals and Non Metals			
Arsenic	EPA 6010	2.0	3.8
Cadmium	EPA 6010	0.50	N. D.
Chromium	EPA 6010	1.0	19
Copper	EPA 6010	1.0	13
Lead	EPA 6010	2.0	9.5
Mercury	EPA 7471	0.020	0.023
Nickel	EPA 6010	1.0	12
Selenium	EPA 6010	2.0	N. D.
Silver	EPA 6010	1.0	N. D.
Zinc	EPA 6010	5.0	44
Physical and Conventional Tests			
Percent Moisture (%)	EPA 160.3	N. A.	23
Soluable Sulfide	EPA 9030	1.0	N. D.
Total Organic Carbon	EPA 9060A Mod.	5,000	N. D.
Total Sulfide	EPA 9030	10	N. D
Organics	**EPA GC/FPD**	**ng/L (ppt)**	**ng/L (ppt)**
Tributyltin		1.0	N.D.

Table 6
(Continued)
Sediment Analyses
Location S1

Constituent (Analyte)	Analytical Method	Reporting Limit µg/Kg (ppb)	Sample Result µg/Kg (ppb)
Organochlorine Pesticides	**EPA 3550/8081A**		
Aldrin		5.0	N. D.
alpha-BHC		5.0	N. D.
beta-BHC		5.0	N. D.
delta-BHC		10	N. D.
gamma-BHC		5.0	N. D.
Chlordane		100	N. D.
4,4'-DDD		5.0	N. D.
4,4'-DDD		5.0	N. D.
4,4'-DDD		5.0	N. D.
Dieldrin		5.0	N. D.
Endosulfan I		5.0	N. D.
Endosulfan II		5.0	N. D.
Endosulfan Sulfate		20	N. D.
Endrin		5.0	N. D.
Endrin aldehyde		5.0	N. D.
Heptachlor		5.0	N. D.
Heptachlor epoxide		5.0	N. D.
Methoxychlor		5.0	N. D.
Toxaphene		200	N. D.
Polychlorinated Biphenyls	**EPA 3550/8082**		
Aroclor 1016		50	N. D.
Aroclor 1221		50	N. D.
Aroclor 1232		50	N. D.
Aroclor 1242		50	N. D.
Aroclor 1248		50	N. D.
Aroclor 1254		50	N. D.
Aroclor 1260		50	N. D.

Table 6
(Continued)
Sediment Analyses
Location S1

Constituent (Analyte)	Analytical Method	Reporting Limit µg/Kg (ppb)	Sample Result µg/Kg (ppb)
Polynuclear Aromatic Hydrocarbons	**EPA 3550/8310**		
Acenaphthene		50	N. D.
Acenaphthyene		50	N. D.
Anthracene		2.0	N. D.
Benz(a)anthracene		2.0	N. D.
Benzo(a) pyrene		2.0	N. D.
Benzo(b)fluoranthene		2.0	N. D.
Benzo(g,h,i)perylene		5.0	N. D.
Benzo(k)fluoranthene		2.0	N. D.
Chrysene		5.0	N. D.
Dibenz(a,h)anthracene		5.0	N. D.
Fluoranthene		5.0	N. D.
Fluorene		20	N. D.
Ideno(1,2,3-cd)pyrene		5.0	N. D.
Naphthalene		20	N. D.
Phenanthrene		5.0	N. D.
Pyrene		5.0	N. D.

Table 7
Sediment Analyses
Location S2

Constituent (Analyte)	Analytical Method	Reporting Limit mg/Kg (ppm)	Sample Result mg/Kg (ppm)
Total Recoverable Oil and Grease	EPA 413.2	5.0	110
Total Recoverable Petroleum Hydrocarbons	EPA 418.1	5.0	76
Metals and Non Metals			
Arsenic	EPA 6010	2.0	3.5
Cadmium	EPA 6010	0.50	N. D.
Chromium	EPA 6010	1.0	15
Copper	EPA 6010	1.0	11
Lead	EPA 6010	2.0	6.3
Mercury	EPA 7471	0.020	N. D.
Nickel	EPA 6010	1.0	8.0
Selenium	EPA 6010	2.0	N. D
Silver	EPA 6010	1.0	N. D
Zinc	EPA 6010	5.0	38
Physical and Conventional Tests			
Percent Moisture (%)	EPA 160.3	N. A.	28
Soluable Sulfide	EPA 9030	1.0	N. D.
Total Organic Carbon	EPA 9060A	5,000	N. D.
Total Sulfide	EPA 9030	10	N. D
Organics	EPA GC/FPD	ng/L (ppt)	ng/L (ppt)
Tributyltin		1.0	N.D.

Table 7
(Continued)
Sediment Analyses
Location S2

Constituent (Analyte)	Analytical Method	Reporting Limit µg/Kg (ppb)	Sample Result µg/Kg (ppb)
Organochlorine Pesticides	**EPA 3550/8081A**		
Aldrin		5.0	N. D.
alpha-BHC		5.0	N. D.
beta-BHC		5.0	N. D.
delta-BHC		10	N. D.
gamma-BHC		5.0	N. D.
Chlordane		100	N. D.
4,4'-DDD		5.0	N. D.
4,4'-DDD		5.0	N. D.
4,4'-DDD		5.0	N. D.
Dieldrin		5.0	N. D.
Endosulfan I		5.0	N. D.
Endosulfan II		5.0	N. D.
Endosulfan Sulfate		20	N. D.
Endrin		5.0	N. D.
Endrin aldehyde		5.0	N. D.
Heptachlor		5.0	N. D.
Heptachlor epoxide		5.0	N. D.
Methoxychlor		5.0	N. D.
Toxaphene		200	N. D.
Polychlorinated Biphenyls	**EPA 3550/8082**		
Aroclor 1016		50	N. D.
Aroclor 1221		50	N. D.
Aroclor 1232		50	N. D.
Aroclor 1242		50	N. D.
Aroclor 1248		50	N. D.
Aroclor 1254		50	N. D.
Aroclor 1260		50	N. D.

Table 7
(Continued)
Sediment Analyses
Location S2

Constituent (Analyte)	Analytical Method	Reporting Limit µg/Kg (ppb)	Sample Result µg/Kg (ppb)
Polynuclear Aromatic Hydrocarbons	**EPA 3550/8310**		
Acenaphthene		50	N. D.
Acenaphthyene		50	N. D.
Anthracene		2.0	N. D.
Benz(a)anthracene		2.0	N. D.
Benzo(a) pyrene		2.0	N. D.
Benzo(b)fluoranthene		2.0	N. D.
Benzo(g,h,i)perylene		5.0	N. D.
Benzo(k)fluoranthene		2.0	N. D.
Chrysene		5.0	N. D.
Dibenz(a,h)anthracene		5.0	N. D.
Fluoranthene		5.0	N. D.
Fluorene		20	N. D.
Ideno(1,2,3-cd)pyrene		5.0	N. D.
Naphthalene		20	N. D.
Phenanthrene		5.0	N. D.
Pyrene		5.0	N. D.

Table 8
Sediment Analyses
Location S3

Constituent (Analyte)	Analytical Method	Reporting Limit mg/Kg (ppm)	Sample Result mg/Kg (ppm)
Total Recoverable Oil and Grease	**EPA 413.2**	5.0	270
Total Recoverable Petroleum Hydrocarbons	EPA 418.1	5.0	210
Metals and Non Metals			
Arsenic	EPA 6010	2.0	N. D.
Cadmium	EPA 6010	0.50	N. D.
Chromium	EPA 6010	1.0	9.3
Copper	EPA 6010	1.0	5.8
Lead	EPA 6010	2.0	12
Mercury	EPA 7471	0.020	0.028
Nickel	EPA 6010	1.0	5.7
Selenium	EPA 6010	2.0	N. D
Silver	EPA 6010	1.0	N. D
Zinc	EPA 6010	5.0	23
Physical and Conventional Tests			
Percent Moisture (%)	EPA 160.3	N. A.	30
Soluable Sulfide	EPA 9030	1.0	N. D.
Total Organic Carbon	EPA 9060A	5,000	5,800
Total Sulfide	EPA 9030	10	N. D
Organics	**EPA GC/FPD**	**ng/L (ppt)**	**ng/L (ppt)**
Tributylitin		1.0	N.D.

Table8
(Continued)
Sediment Analyses
Location S3

Constituent (Analyte)	Analytical Method	Reporting Limit µg/Kg (ppb)	Sample Result µg/Kg (ppb)
Organochlorine Pesticides	**EPA 3550/8081A**		
Aldrin		5.0	N. D.
alpha-BHC		5.0	N. D.
beta-BHC		5.0	N. D.
delta-BHC		10	N. D.
gamma-BHC		5.0	N. D.
Chlordane		100	N. D.
4,4'-DDD		5.0	N. D.
4,4'-DDD		5.0	N. D.
4,4'-DDD		5.0	N. D.
Dieldrin		5.0	N. D.
Endosulfan I		5.0	N. D.
Endosulfan II		5.0	N. D.
Endosulfan Sulfate		20	N. D.
Endrin		5.0	N. D.
Endrin aldehyde		5.0	N. D.
Heptachlor		5.0	N. D.
Heptachlor epoxide		5.0	N. D.
Methoxychlor		5.0	N. D.
Toxaphene		200	N. D.
Polychlorinated Biphenyls	**EPA 3550/8082**		
Aroclor 1016		50	N. D.
Aroclor 1221		50	N. D.
Aroclor 1232		50	N. D.
Aroclor 1242		50	N. D.
Aroclor 1248		50	N. D.
Aroclor 1254		50	N. D.
Aroclor 1260		50	N. D.

Table 8
(Continued)
Sediment Analyses
Location S3

Constituent (Analyte)	Analytical Method	Reporting Limit µg/Kg (ppb)	Sample Result µg/Kg (ppb)
Polynuclear Aromatic Hydrocarbons	**EPA 3550/8310**		
Acenaphthene		50	N. D.
Acenaphthyene		50	N. D.
Anthracene		2.0	N. D.
Benz(a)anthracene		2.0	4.6
Benzo(a) pyrene		2.0	3.3
Benzo(b)fluoranthene		2.0	2.0
Benzo(g,h,i)perylene		5.0	N. D.
Benzo(k)fluoranthene		2.0	N. D.
Chrysene		5.0	7.3
Dibenz(a,h)anthracene		5.0	N. D.
Fluoranthene		5.0	20
Fluorene		20	N. D.
Ideno(1,2,3-cd)pyrene		5.0	N. D.
Naphthalene		20	N. D.
Phenanthrene		5.0	6.9
Pyrene		5.0	7.1

APPENDIX - G

AIR QUALITY ANALYSIS DATA
AND
RECORD OF NON-APPLICABILITY (RONA)

LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

RECORD OF NON-APPLICABILITY
FOR
LOWER MISSION CREEK FLOOD CONTROL IMPROVEMENT PROJECT
SANTA BARBARA COUNTY
SANTA BARBARA, CALIFORNIA

The study area is limited to the final 1.2 miles of channel upstream of the tidal estuary where Mission Creek reaches the Pacific Ocean. The proposed project will include improvement of the channel for 1.2 miles of the creek between Canon Perdido Street Bridge at the upstream end, and Cabrillo Boulevard Bridge near the outlet; replacement of five bridges; streamlining bedslope; installing a culvert that bypasses the oxbow; stabilizing creek banks using vertical walls and riprap sideslope; and planting of native vegetation along riprap. The creek width would range from 60 to 70 feet at the top. Average depth of the creek would be 8 to 12 feet throughout the project reach.

The Clean Air Act (CAA) as amended in 1990, specifies in Section 176© that no department, agency, or instrumentality of the Federal Government shall engage in, support in any way, or provide financial assistance for, license or permit, or approve, any activity which does not conform to an implementation plan after it has been approved or promulgated under Section 110 of this title. "Conformity" is defined in Section 176© of the CAA as conformity to the State Implementation Plan's (SIPs) purpose of eliminating or reducing the severity and number of violations of the National Ambient Air Quality Standards (NAAQS) while achieving expeditious attainment of such standards, and that the activities will not:

1. Cause or contribute to any new violation of the NAAQS; or

2. Increase the frequency or severity of any existing violation;

3. Delay timely attainment of a standard, interim emission reductions, or milestones.

Air quality standards in the area of Lower Mission Creek are under the jurisdiction of the Santa Barbara County Air Pollution Control District (APCD). The APCD acts as lead agency, responsible agency or a concerned agency with jurisdiction by law over the air resources of the County under the California Environmental Quality Act (CEQA). The 1998 Clean Air Plan (CAP) is the most recently adopted clean air plan for the Santa Barbara County.

Currently, the entire County of Santa Barbara violates the state and federal ambient one-hour standards for ozone and the state standard for PM10. The major sources of ozone precursor emissions in Santa Barbara County are motor vehicles, the petroleum industry and solvent usage. Sources of PM10 include mineral quarries, grading, demolition, agricultural tilling, road dust, and vehicle exhaust.

Estimation of air quality impacts was performed under the guidance of the SCAQMB using methods prescribed in the 1993 California Environmental Quality Act (CEQA) Air Quality Handbook published by the South Coast Air Quality Management District (SCAQMD). Although quantitative thresholds of significance are not currently in place for short-term emissions, CEQA requires that short-term impacts be discussed in the environmental document. These concerns are addressed in Chapter 8 of the Environmental Impact Statement (EIS). In the interest of public disclosure, APCD recommended that construction-related ROC, PM10 and Nox emissions from diesel and gasoline powered equipment, paving and other activities, be quantified.

To determine the significance of air quality impacts, daily thresholds were based on construction emission from South Coast Air Basin (SCAB) and Coachella Valley area. If emissions on an individual day exceed 75 lbs a day for ROC, or 100 lbs a day for Nox, or 550 lbs a day for CO, or 150 lbs a day for PM10, the project should be considered significant. Also, APCD requires that the construction emissions not exceed 25 tons per year.

Based on the air quality analysis described in tables G-1 through G-6, the proposed project will not have a significant air quality effect on the environment. The total emissions of each criteria pollutant are below *de minimus* levels as prescribed in 40 CFR 93.153(b). This proposed project conforms with the Federal Clean Air Act as amended 1990. As a result, this Record of Non-Applicability is prepared instead of a conformity determination.

For further information, please contact Mrs. Priscilla E. Perry, Civil Engineer, U.S. Army Corps of Engineers at (213) 452-3878.

31 Aug 00
Date

For [signature], LTC, EN
John P. Carroll
Colonel, Corps of Engineers
District Engineer

APPENDIX - G
LOWER MISSION CREEK FLOOD CONTROL PROJECT
AIR QUALITY EVALUATION METHODS

Evaluating the air quality impacts associated with the proposed Lower Mission Creek Flood Control Improvement Project can be separated into two separate analyses. First, would be the temporary, short-term emissions generated during project construction, which include exhaust emissions from heavy equipment operation associated with grading, and excavation activities and Personnel and Trucks commuting back and forth to the proposed site. Total excavated material will be 82,000 cubic yards. Material to be transported to disposal sites would be about 64,000 cubic yards. Second, would be fugitive emissions generated by the bulldozer operation and Trucks traveling on paved and unpaved roads. Each of these analyses are performed separately and then combined to arrive at total emission estimates related to both operations.

Exhaust and dust emissions due to project construction includes earth-fill material, concrete for walls, footings, and box culvert.

These exhaust emissions were estimated based on the type and number of construction equipment being operated and vehicle truck miles over a two year period. Dust emissions were estimated based on the earthwork (excavation, grading, and compaction).

Emission factors were obtained from the 1993 CEQA Air Quality Handbook (SCAQMD) using Tables A9-8-A,B,C,&D, A9-5-K-5 and A9-9-B, C, D, and F.

As requested by the Santa Barbara County Air Pollution Control District, construction-related ROC, PM_{10} and NOx emissions have been quantified and are presented herein. The impacts due to the new construction will not pose any significant impacts to the current air quality over the two-year period and will conform to the existing 1998 Clean Air Plan under the Santa Barbara Air Pollution Control District.

LOWER MISSION CREEK
AIR EMISSION DATA AND CALCULATIONS

1. Improvements to Lower Mission Creek. Disposal of 64,000 cy material

2. Type and Number of Construction Equipment to be used. All equipment will use diesel fuel.

2 – Graders	1 - Water Truck
4 - Bucket Excavators	1 – Roller
3 – Dozers	2 - Loaders

3. These calculations were based on the 1993 CEQA Air Quality Handbook emission factors and formulas assuming the following:

Initial Input Information:

Construction Phase: 18 months
21 working day per month for 8 hours per day
378 working days
30 personnel, 30 Vehicles

Source: CEQA handbook for emission factors and other activity assumptions.

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4. Fugitive emissions Calculation. Used table A9-9-F. Estimating emissions from bulldozing operations. Using Overburden and Moist soil from tables A9-9-F-1 and A9-9-F-2. It is assumed that all dozers will be working at one time.

Table G-1

Equipment	Number of Equipment	Hours of operations Per day	PM-10 lbs/day
Bulldozers	3	5	6.90
TOTAL (lbs/day)			6.90

EXAMPLE CALCULATION:

$E=([0.45 \times (\{[G]^{1.5}\}/\{[H]^{1.4}\})] \times I) \times J$: where G = 7.5, H = 15.0, J = hours of operation (5 hrs/day), I = 2.2046.

E = 2.30 lbs/day for one dozer. It is assumed that the Dozers will operate 60% of the time; or 5 hrs/day each.

5. Estimating Fugitive emissions for Vehicle Miles Traveled for construction personnel. It is assumed that 30 personnel will work and 30 Vehicles used. Personnel will commute from approximately 20 miles one-way.

V=W x (X/Y) x Z; Where V=VMT, W=Distance, X=number of vehicles, Y=1 hour, Z= estimated travel time

VMT= 40 miles/day x (60/hr) x 1 hr = 2,400 miles per day

6. Estimating fugitive emissions from passenger Vehicle Travel on Paved Roads

E = V x F(w/o street cleaning); where E= emissions for passenger vehicles; V= VMT; F = 0.00065 for freeways

E = 2400 miles/day x 0.00065 lbs/mile = 1.56 lbs/day

7. Estimating Fugitive emissions for Vehicle Miles Traveled for Trucks. It is assumed that 17 trucks will be used. Distance will be 25 miles for on roads and .25 miles for off roads.

V=W x (X/Y) x Z; Where V=VMT, W=Distance, X=number of trucks, Y=1 hour, Z= estimated travel time

VMT = 50 miles/day x (17/hr) x 0.5 hr = 425 miles per day

8. Estimating emissions from truck travel on paved roads.

E = V x F; where E = emissions for trucks; V = VMT; F = 0.77 x $([G \times 0.35])^{0.3}$ lbs/mile; where G = 0.022 for freeway.

E = 425 miles/day x 0.18 lbs/miles = 76.5 lbs/day

9. Estimating Emissions from vehicle travel on unpaved roads

V=W x (X/Y) x Z; Where V=VMT, W=Distance, X=number of trucks, Y=1 hour, Z= estimated travel time

V = 0.5 miles/day x (17/hr) x 0.5 hr = 4.25 miles per day

FOR TRUCKS

E = V x F; where E = emissions for vehicle travel; V = VMT; F = emission factor
F = 2.1 x [G/12] x [H/30] x $\{[I/3]^{0.7}\}$ x $\{[J/4]^{0.5}\}$ x {[365 – K]/365} lbs/miles; where G = 28; H = 15 miles/hr; I = 10,000 lbs/2000 lbs = 5 tons; J = 6; K = precipitation Conditions in days = 34

F = 2.1 x 2.33 x 0.5 x 1.43 x 1.22 x 0.91 = 3.88 lbs/miles

Therefore, E = 12.50 miles/day x 3.88 lbs/miles = 16.49 lbs/day for Trucks

Table G-2

10. Total Fugitive Emissions

TYPE OF VEHICLE	NUMBER OF VEHICLES	VMT/DAY (on-road)	VMT/DAY (off-road)	EMISSIONS (on-road) (lbs/day)	EMISSIONS (off-road) (lbs/day)
Personnel	30	2,400	-0-	1.56	-0-
Trucks	17	1,700	340	76.50	16.49
Equipment					6.90
Total emissions				78.06	23.39

11. <u>Hourly exhaust emissions table</u>: Equipment emissions factors are taken from Table A9-8-A and A9-8-B,C,D. It is assumed that the graders will work 50% of the time; excavators 40%; loaders 50%; truck and roller will operate full time. Used Table A9-8-B,C,D for Excavators. Used miscellaneous type under A9-8-A for water truck. This method is more conservative when there are unknowns.

Table G-3

Emission Calculations: E=(FxG)xH; where F=Numbers, G=Hours, H=Emission factor

Equipment Type	**Numbers**	**Hours of Operation**	**CO lb/day**	**ROC lb/day**	**NOx lb/day**	**SOx lb/day**	**PM10 lb/day**
Graders	2	4	1.21	0.31	5.70	0.69	0.49
Bucket excavators	4	3	4.29	0.39	9.36	0.78	0.58
Water Truck	1	8	5.40	1.20	13.6	1.14	1.12
Rollers	1	8	1.24	0.27	3.60	0.28	0.21
Loaders	2	4	1.61	0.76	6.64	0.61	0.47
TOTALS (lbs/day)	--------	---------	13.75	2.93	38.90	3.50	2.87

<u>Example Calculation for Grader</u>: Emission factors are taken from <u>Table A9-8-A</u> under the diesel column. Emission Calculations: E=(FxG)xH; where F=Numbers, G=Hours, H=Emission factor. Total hours of construction operation = 4 hrs/day. Grader will work 50% of the time = 4 hrs. Since there are two Graders, then 4 x 2 = 8 hrs of operation/day.

E=(2)x(4 hrs/day)x(0.151 lb/hr) = <u>1.21 lb/day</u>

<u>Example Calculation for Excavator: Used Table A9-8-B,C,D</u>

E=(FxG)x(KxLxM); where F= Numbers, G=Hours, L=Emission Factor, K= horsepower, M=Load factor divided by 100.

E=(4 x 3 Hrs/dy)(56 Hp x.011 lb/Hp-Hr x 58/100) = <u>4.29 lbs/day</u>

12. <u>Vehicle Exhaust Emissions Due to Transport of 64,000 cy material to Construction Site via On-Road Trucks</u>.

Volume of Material needed (cy)	64,000	Total # of Trips Required = 2,130
Truck hauling Capacity (cy)	30	Vol of material hauled per day = 510 cy
Truck Weigh	> 6K	# of trips required per day = 17
Number of Trucks used	17	Vehicle miles traveled per day
Project time (Months)	18	On-Road = 425 miles/day
Travel Distance (miles/Trip)		Off-road = 85 miles/day
On-Road (one way)	25	
Off-Road (one way)	5	
Speed (mph)		
On-Road	55	
Off-Road	35	
Work Area:	2	
Year:	1999	
Table:	A9-5-k-5	
Cold Starts:	100%	
Hot Start	0%	

Table G-4

Off-Road Emission Factors (gram/mile)

Activity	PM-10	CO	ROC	Nox	Sox	Pb
Exhaust + Evaporative	0.28	8.05	0.99	4.45	0.31	0.0007
Tire Wear	0.19					
Cold Start		33.18	2.36	1.97		
Hot Start		3.69	0.68	0.97		
Hot Soak			0.62			
Diurnal			2.32			

Off-Road Emission (lb/day)

Activity	PM-10	CO	ROC	Nox	Sox	Pb
Travel Emissions	0.08	1.51	0.19	0.83	0.06	0.0001
Cold Start		1.24	0.09	0.07		
Hot Start		0.0	0.0	0.0		
Hot Soak			0.02			
Diurnal			0.09			
Totals	0.08	2.75	0.39	0.90	0.06	0.0001

Table G-5

On-Road Emission Factors (gram/mile)

Activity	PM-10	CO	ROC	Nox	Sox	Pb
Exhaust + Evaporative	0.28	7.25	0.67	5.53	0.31	0.0007
Tire Wear	0.19					
Cold Start		33.18	2.36	1.97		
Hot Start		3.69	0.68	0.97		
Hot Soak			0.62			
Diurnal			2.32			

On-Road Emission (lb/day)

Activity	PM-10	CO	ROC	Nox	Sox	Pb
Travel Emissions	0.44	6.79	0.63	5.18	0.29	0.0007
Cold Start		1.24	0.09	0.07		
Hot Start		0.0	0.0	0.0		
Hot Soak			0.02			
Diurnal			0.09			
Totals	0.44	8.03	0.83	5.25	0.29	0.0007

Travel emissions: [(emission factors (Exhaust+Tire wear)) x (Distance traveled(VMT))]/(454 grams/lbs)
Cold start: [(#vehicles) x (Cold start emission factor)]/454 gram/lbs)
Hot Start emissions: [(# daily trips) –(# of vehicles)] x (Hot start emission factor)/454 gram/lbs)
Hot soak emissions: (# daily trips) x (Hot soak emission factor)/454 grams/lb)
Diurnal Emissions: (#Vehicles) x (Diurnal emission factor)/454 grams/lbs)
VMT per day: (#Trips per day) x (One-way Trip Distance x 2)

13. Total project emissions.

Table G - 6

Source	PM-10	CO	ROC	NOx	SOx	Pb
Exhaust	3.39	25.99	4.33	45.47	3.88	-------
Fugitives	101.45					
Daily Totals (lbs/day)	104.84	25.99	4.33	45.47	3.88	
Daily Thresholds (lbs/day)	150	550	75	100	150	
Number of construction days per two year	378	378	378	378	378	
Total Project (lbs/yr)	19,814.76	4,912.11	818.37	8,593.83	733.32	
Total Project (ton/yr)	9.90	2.46	0.41	4.30	0.37	
Annual Threshold (ton/yr)	25	25	25	25	25	
Significance	No	No	No	No	No	

APPENDIX - H

MITIGATION MONITORING PLAN

LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

MITIGATION AND MONITORING PLAN
FOR
LOWER MISSION CREEK PROPOSED FLOOD CONTROL PROJECT
AND
FUTURE MAINTENANCE
SANTA BARBARA, CALIFORNIA

I. EXECUTIVE SUMMARY:

A. Location of Project:

The proposed project is located along Lower Mission Creek, Santa Barbara, Santa Barbara County, California. The project area is limited to the final 1.2 miles of the creek, between Canon Perdido Street and Cabrillo Boulevard (Figure 1). This project does not extend to the lagoon. Plans of all evaluated Alternatives are included in the Main Report. The locations of five to six habitat expansion zones are identified in the preliminary design attachment.

B. Introduction:

This Mitigation Monitoring Plan is prepared based on evaluation of environmental resources identified in the Environmental Impact Statement/Environmental Impact Report (EIS/EIR), Lower Mission Creek Flood Control Project. The mitigation monitoring plan is prepared for the implementation of project construction and future maintenance. This mitigation monitoring plan provides details of mitigation and monitoring of planted vegetation, two Federally listed species, tidewater goby and steelhead, and water quality to minimize project related impacts. Section 24 of the Environmental Impact Statement/Environmental Impact Report (EIS/EIR) provides mitigation measures and environmental commitments for all environmental resources. Mitigation and monitoring for all applicable resources have been tabulated and enclosed in Appendix H of the EIS/EIR.

The environmental document is written in compliance with the National Environmental Policy Act (NEPA) and California Environmental Quality Act (CEQA). The affected environment and impact analysis by each resource have been discussed in detail in Sections 6 through 19 of the EIS/EIR.

The CEQA requirement stipulates that: "The public agency shall adopt a reporting or monitoring program for the changes to the project which it has adopted or made a condition of project approval in order to mitigate or avoid significant effects on the environment. The reporting or monitoring program shall be designed to ensure compliance during project implementation" (A.B. [Assembly Bill] 3180, Section 21081.6; Amended: Chapter 1232, Statutes of 1993).

Alternative 12 is the National Economic Development (NED) and tentatively recommended plan. Alternative 1, the No Action/No Project Alternative, represents the future without project condition. See Section 3 of the EIS/EIR for details on alternatives. The EIS/EIR also includes impacts and mitigation measures related to future maintenance activities.

During plan formulation study, twelve alternatives were formulated to provide flood protection to the city of Santa Barbara. Alternative 12 provides maximum opportunity for providing incidental environmental benefit by planting of native riparian vegetation, compared to all other viable alternatives. The proposed recommended plan yield greater habitat values than currently exist. Due to project construction, there would be loss of existing vegetation, nearly all of which is non-native. However, the project design incorporates planting of native riparian vegetation along the upper banks of the creek and within the open spaces left within the project area (features called habitat expansion zones). Loss of the vegetation generated due to implementation of the project would be offset by planting vegetation within the project area. The Corps of Engineers and Santa Barbara County, local sponsor for the project, do realize that this is a self-mitigating project. But monitoring, maintenance and success criteria would be necessary to accomplish the project goal to improve quality and quantity of vegetation. Therefore, this plan identifies mitigation and monitoring for the planted vegetation as well as for the significant resources located within the project area.

The project area supports two Federally listed threatened and endangered species, steelhead (*Oncorhyncus mykiss*-Federally endangered) and tidewater goby (*Eucyclogobius newberryi*-Federally threatened). Section III of this report provides details of mitigation measures and monitoring requirements for the impacted biological resources.

II. **PROJECT DESCRIPTION (Refer to Section 3.5 of the EIS/EIR for details and enclosure 1 of the biological assessment)**:

Alternative 12 is the tentatively recommended and locally preferred plan. It would increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of flood protection. The natural bottom would be maintained and creek banks would consist of a combination vertical wall and ungrouted riprap. The bottom half of the bank would consist of a vertical wall while the upper half would be built with riprap at a 1.5:1 (H:V) slope. Aesthetic treatment would be incorporated into the project design to minimize the visual impacts of vertical walls. The riprap would be covered with topsoil. Concrete pipes of varying sizes (up to a maximum of three feet in diameter) would be strategically placed in between the riprap to allow planting of native trees and vegetation. Native willows or branches and other native herbaceous plants would be planted beneath the riprap and would sprout through gaps in it to form continuous understory riparian growth. Future maintenance is an integral part of the project.

Installation of Culvert:

The improved creek would generally follow the existing alignment and would incorporate a new culvert between Highway 101 and the Chapala Street Bridge that would carry high flows and bypass the oxbow. The oxbow would be left in place to function as the low flow channel. The culvert will extend between the upper end of the oxbow and the Chapala Street Bridge, roughly 830 feet long. The culvert and the existing watercourse will reunite immediately below that bridge. Except where it passes under Highway 101and is open to the air, the first 200 feet of its full length, about 75% of the box culvert would be buried and completely dark, including the downstream end of the structure (see Section 3.5 of the EIS/EIR and enclosure of the biological assessment (project description).

Habitat Expansion Zones:

Five small parcels of open land would be left along the banks after completion of project construction. These parcels range in size between 0.03 and 0.14 acres. These habitat zones would be designed to serve a dual purpose: to expand the corridor of riparian habitat to be planted along the stream banks. and to provide for passive park space for area residents. Native trees, primarily western sycamores, cottonwoods, and coast live oak, from local nursery stock would be planted in the habitat expansion zones. In time, their canopies would form dense clusters on the overbank and adjacent to the stream corridor. In some of these zones, pathways and benches might also be added to create passive park spaces.

Sideslope Planting:

Planting along the riprap and planting of native trees in habitat expansion zones are an integral part of the project design. The ecological values generated by these features would offset impacts from the implementation of the proposed alternative on existing biological resources. Therefore, no biological mitigation would be required. This proposed alternative would provide maximum biological values compared to all other alternatives evaluated in this document. In the long-term, the habitat value within the project reach would exceed the value of the existing habitat.

If any of the planting on the aforementioned features is deleted from the project design, then impacts related to the biological resources would need to be recalculated, which could result in the need for additional mitigation.

This alternative would also provide the opportunity to construct another expansion zone in the vicinity of the oxbow formation area. This habitat expansion zone would be located just upstream of Highway 101. It would be located in the vicinity of De la Vina Street on the west and Gutierrez Street on the north. The total area to be created would be about 0.6 acres (25,800 square feet, see Figure 2 for the location) This area was originally proposed as a constructed wetland. However, after further review, it was determined that this site is more suitable for use

as a habitat expansion zone, as described above. The construction of this feature would provide additional ecological benefits. However, its construction would be subject to cleanup of the existing known contamination on the site (see details in Section 15, HTRW of the EIS/EIR). If, prior to the completion of project construction, the designated site is remediated, then the habitat expansion zone would be constructed as planned.

Future Maintenance:

R Future maintenance of the creek is an integral part of the Recommended Alternative (Alternative 12). To ensure and maintain its design function and form, some maintenance of the design capacity of the channel would be needed on a regular basis. Any areas where sediment deposition and/or vegetation growth occur beyond 15% of the channel capacity would be required to be removed to maintain the capacity of the project reach. Future maintenance would also include maintenance of the structures such as cleaning of oxbow culverts, repair of vertical concrete walls and riprap (bottom riprap lining and baffle piers), and maintenance of planted vegetation (after initial establishment required as part of project construction). It is estimated that the average frequency of sediment removal would occur at intervals of about three years. However, when several low-flow years occur sequentially, sediment removal might be needed less frequently. Floodflows and debris accumulation and removal would continue to impact channel vegetation and aquatic resources. Over time, pools and riffles that provide aquatic habitat would reestablish in the channel.

Impact analysis for future maintenance is included for each resource in the EIS/EIR. Impacts related to maintenance activities are addressed in Chapters 6 through 19. Mitigation measures for future operation and maintenance for the life of the project are included in the EIS/EIR. Conditions identified in the EIS/EIR would be followed during each operation and maintenance activity. A detailed description of each maintenance activities is described in Section 3.5 of the EIS/EIR and enclosure 1 of the biological assessment. A brief description of the Future Maintenance performed by Santa Barbara County is provided in the following paragraphs.

Duration of Future Operation Maintenance:

Sediment removal would occur when the flow of water approaches the seasonal minimum, i.e. between mid-August and mid-October. Operation and maintenance would not occur between December 1st and March 30th to avoid impacts to steelhead, a Federally listed species. However, in an emergency circumstance created by a very heavy storm event, operation/maintenance of the channel invert could be required between December and March. If maintenance work occurs during these months in flowing water, a qualified biologist would be needed on site to monitor the sediment removal activities. Environmental commitments identified in Section would be followed during future sediment removal operations.

C. **Responsible Parties**: The U.S. Army Corps of Engineers (USACOE) would accomplish construction of the project and planting required vegetation along the sideslopes and habitat expansion zone. For the first two years the USACOE would be responsible for planting and monitoring of the planted vegetation. The USACOE or selected contractor also would be responsible for implementation of mitigation measures identified in Section 24 the EIS/EIR to avoid impacts to the environmental resources, particularly to minimize impacts to Federally listed species tidewater gobies and steelhead. Project construction would be monitored by the Corps of Engineers. Planting of vegetation would be monitored for five years. For the first two years planted vegetation would be maintained and monitored by the Corps of Engineers and the remaining three years would be performed the Santa Barbara County Flood Control District (SBCFCD). The environmental commitments identified in the EIS/EIR and this Mitigation Monitoring Plan would be followed by the SBCFCD for future maintenance activities.

III. BIOLOGICAL RESOURCES (Refer Section 10 of the EIS/EIR for details of an Existing Conditions and Impact Analysis):

The mitigation monitoring of the biological resources is divided by the resource category, vegetation and aquatic resources. A brief discussion of existing conditions and impacts on biological resources are in the paragraphs below.

A. Stream Bank Vegetation:

Existing Conditions:

R The proposed alternative would affect about ¾ of the existing banks within the project's overall area. The other quarter of banks along the lower portion of Mission Creek occur between Highway 101 and the downstream side of Yanonali Street. By design of Alt.12, it would not alter in any way the streambed or banks through this reach, which amounts to most of the oxbow and the entire length of the sandstone channel. As it happens, every foot of these banks, about 2060 linear feet counting both sides and all the bridges in between, are entirely bare of plant growth anyway. The length of banks between the upstream side of the freeway and the downstream side of the bridge at Yanonali Street has been disregarded altogether from environmental analyses since it would not be a part of the flood control project anyway.

R In those areas to be disturbed by stream bank construction, the presence of hardened bank surfaces currently exerts a strong effect on the abundance and vigor of plants along the creek. All totaled, 7310 linear feet of stream bank exists within the project area, measured on both sides of the creek and excluding from that total the widths of bridges and their flanking walls and disregarding the segment from the freeway through the sandstone channel. Of the existing banks which are not structural components of bridges, 2100 linear feet of stream bank (29%, counting both sides of the creek) have natural soft surfaces, while 5210 linear feet (71%,) have have been armored by some means or other. In essence, revetments cover about ¾ of these banks.

These revetments, of quite diverse materials and thoroughness, are not uniformly solid and impenetrable by plant roots. However, plants native to a stream side habitat in southern California are few and far between. Save for large and venerable western sycamores (*Platanus racemosa*) at six locations along the creek, it retains almost none of the stratification of canopy and understory species it must have had a century and more ago. Widely scattered arroyo willows (*Salix lasiolepis*) and white alders (*Alnus rhombifolia*) growing even more sparsely hint of what was once there below its riparian canopy, but nothing more than hint. Invasive non-native species compose virtually the entire plant assemblage along the creek. Now, giant reed (*Arundo donax*) forms the most conspicuous element of stream bank vegetation, and probably would rank highest in biomass of anything growing along the creek.

Project related Impacts:

Project implementation would cause removal of the existing bank vegetation. The project design incorporates planting along the riprap and planting of native trees in habitat expansion zones. The ecological values generated by these features would offset impacts from the implementation of the proposed alternative on existing biological resources.

Mitigation (Vegetation):

In total, about 4740 linear feet of riprap bank would be created. Bank stabilization upstream of Highway 101 would rely primarily on slopes armored by riprap. Cylindrical planters placed through the riprap would admit canopy and understory species. The final surface would be hydro-seeded with an appropriate mixture of annual and perennial native grasses. In nearly all locations, this design creates a plantable corridor slightly more than 11 feet wide, so the proposed project would install just under 1 acre of stream bank corridor.

The proposed project also includes planting of vegetation within the five habitat zone along the creek. An appropriate mixture of annual and perennial native grasses as well as upland shrubs appropriate to this climate and location would be applied by hydro-seeding.

Summary of Mitigation Measures/Environmental Commitments (Vegetation):

- Species to be plated within the project area shall be coordinated with the project biologist. The selected contractor shall plant the species as identified in this section.

- Any dead or dying trees and shrubs originally set out in planters along the banks corridors shall be replaced in kind, except during midsummer.

- Trees and shrubs that do not survive shall be replaced as soon as possible with local nursery stock.

- Install a temporary, above ground irrigation system to irrigate planted vegetation for a maximum of about 3 years.

- Use contamination free water from municipal sources.

- Ensure that planted vegetation is watered sufficiently. Watering requirements may vary according to weather conditions.

- All giant reed growth shall be treated thoroughly as fits the circumstances: careful foliar application of glyphospte herbicides, cutting the canes at the ground and painting the cut surfaces with glyphospte, or digging out the rhizomes where possible.

- Vegetation control would be accomplished by either brushing, clearing or spraying. Clearing could be done using mechanical equipment such as a dozer.

- During future maintenance, partial removal of vegetation would occur yearly. The removal would follow a mosaic pattern, wherein one half the creek bed would be cleared. The remaining half would then be cleared the following year.

Mitigation Goal for Streambed Vegetation:

- Obtain higher quality and quantity habitat by planting much higher quality species and many more of them in areas larger than exist currently.

- Restore the current effective thickness and height of existing plants within 3 to 5 years.

- Attain the structural complexity/diversity of vegetation equal to a coastal stream habitat within 30 years.

- Non-native vegetation shall be controlled with herbicide and/or removed.

- Replace coarse, invasive, non-native stream bank vegetation with tree species capable of forming an overhead gallery where canopies touch, and appropriate understory species adapted to the riparian ecological niche of coastal California streams.

- Preserve large western sycamores (*Platanus racemosa*) growing along the creek banks if possible.

- Plant dense clusters of stream side and upland species in five habitat expansion zones along the creek's banks.

- Plant native trees directly to the water's edge in two locations. Shade from trees would buffer water temperature in most of the creek during summer months.

- Indirectly re-establish an ecologically important component of assimilable nutrients and energy to organisms living in the creek itself through leaf litter from these plantings.

Monitoring Requirements for the Planted Vegetation:

- The growth rates of the trees and shrubs shall be documented for 5 years. As outlined in this Mitigation Monitoring Plan and the Environmental Commitments discussed in the EIS/EIR, if the plants do not meet pre-determined growth and survival rates, actions shall be taken to improve growing conditions such as fertilization, increased irrigation and replanting.

- For the first year after completion of construction, the stream bank corridors and habitat expansion zones shall be monitored every three months.

- During the second year of operation, stream bank corridors and habitat expansion zones shall be monitored every four months.

- During the third, fourth, and fifth year after construction, maintenance of planted vegetation would occur every six months.

- Following the 5th year, County Flood Control would assume all operational and maintenance activities. Monitoring of plants would be incorporated into the annual maintenance of the streambed (described above, Section 2).

- Monitor the layer of fill over the rip-rap to encourage understory growth. Periodical soil augmentation on the banks may be accomplished by using deposited stream bed sediment or imported soil from other areas. This will typically occur when earthen channel maintenance is required.

- Ensure installed irrigation system is working properly and plants are irrigated sufficiently to allow desired growth.

- Rip-rap shall be periodically inspected. If rip-rap is removed or damaged by any means to the extent that the integrity of the project is compromised, it shall be replaced.

- At each monitoring period, a monitoring report shall be prepared. After completion of monitoring of vegetation for five years, a final report shall be prepared.

- Monitor survival rate of the trees as identified in this monitoring plan (paragraph 3.6 Performance Criteria). All dead plants should be noted and plated.

Likelihood of Success:

Establishment, growth and expansion, and the eventual full maturation of vegetation planted on side slopes and into habitat expansion zones will be a steady and slow process, starting from seed for some species, vegetative propagation by cuttings of other species, and liner stock of some species. Within 3 to 5 years, the suite of plants along the riprap corridors would achieve sufficient height and density of foliage to shade substantial portions of the creek's streambed (Shading analysis, attached).

The gallery trees included should have grown sufficiently high and broad that their canopies overlap each other along the corridor of each bank after 30 years. The plantings could be considered mature at that point, but the structural complexity established by understory and canopy certainly would not become static then. Moreover, the tree species included in the design then would be well on their way to potentially long lifespans and eventual statuesque form, such as the sycamores at De la Guerra and at Mason Streets now exhibit.

Several entities would have an opinion about species to be planted, so the list below is not definitive. It includes native species which will have desirable growth forms on the riprap slopes and the habitat expansion zones. Plants, seeds and cuttings would be collected from the local area, preferably within the project area. If it is necessary to go outside the project area, collection areas should be near by and within the coastal portions of local creeks.

Species contributing to the canopy

western sycamore (*Platanus racemosa*)
Fremont's cottonwood (*Populus fremontii*)
black cottonwood (*Populus trichocarpa*)
coast live oak (*Quercus agrifolia*)
white alder (*Alnus rhombifolia*)
California bay (*Umbellularia californica*)

Understory species

Arroyo willow (*Salix lasiolepis*)
wax myrtle (*Myrica californica*)
Mexican elderberry (*Sambucus mexicana*)
squaw bush (*Rhus trilobata*)
blackberry (*Rubus ursinus*)

Native shrubs

toyon (*Heteromeles arbutifolia*)
laurel sumac (*Malsoma laurina*)
coyote brush (*Baccharis pilularis*)
holly-leafed cherry (*Prunus ilicfolia*)

Native grasses

giant wild rye *(Leymus condensatus)*
melic grass *(Melica californicus)*
deer grass *(Muhlenbergia rigens)*
California muhly *(M. californica)*
purple needle grass *(Nasella pulchra)*
nodding needle grass *(N. cernua)*
foothill needlegrass *(N. lepida)*

and other appropriate species not yet decided upon . .

Summary of Planted Vegetation Success:

- As planned, at least 120 trees would be planted into the 4740 linear feet of riprap banks. Structural design necessities of the walls dictate spacing between trees on riprap slopes.

- At a minimum, 115 trees can be planted into five habitat zones. Canopy forming trees can be planted closer together in the habitat expansion zones.

- Achieve 90% success of the planted vegetation at end of five years of planting, and ensure that vegetation survival rate is equivalent to the success criteria identified in Table 1 of this Mitigation Monitoring Plan.

- The upland shrub species in habitat expansion zones should have attained at least 50% the height and breadth typical of each in this climate, and overall at least 40% of these plants from nursery stock would still be alive and well.

- Minimum of 50% of these corridors would be occupied by willows. Willows would be about 7 to 10 feet in height 5 years after planting them. Growth of this vegetation should form the bulk of understory biomass along the riprap slopes.

Performance Criteria:

Reintroduction of the species native and adapted to this stream bank habitat will probably progress fairly slowly. All trees, and all upland vegetation planted in cylindrical opening through the riprap, shall be replaced should they die by the end of the fifth year after the project has been finished. The initial progress of their reintroduction can be measured most suitably by the coverage of ground surface, general vigor of plants, and height of vegetation. Appropriate benchmarks include:

TABLE -1
SUCCESS RATE FOR PLANTED VEGETATION

Evaluation time	% ground covered by native perennial	% of plants in generally good health	% of plants at least 5 feet high
after 1 year	5%	40%	< 5%
after 2 years	12%	55%	15%
after 3 years	30%	75%	40%
after 4 years	50%	85%	65%
after 5 years	75%	90%	80%

The understory and the canopy species cannot acquire the expected growth forms within an arbitrarily short time, of course. Both elements of the stream bank habitat will continue to

grow and proliferate for decades. Overall success should be judged 8 years after construction of the flood control project, which would be 3 to 5 years after cessation of temporary irrigation. At that time, 75% of the canopy species should be alive and well. They would have grown to at least a height of 8 feet and trunk diameter at least 2 inches.

The upland shrub species in habitat expansion zones should have attained at least 50% the height and breadth typical of each in this climate, and overall at least 40% of these plants from nursery stock would still be alive and well.

Willows should form the bulk of understory biomass along the riprap slopes. At a minimum, 50% of these corridors would be occupied by willows. Plants themselves would be 7 to 10 feet high.

Plants on the riprap slopes would begin to shade the creek bed three years after construction of the project (attached shading study). By the 8th year, their size should be sufficient to cast shade over the entire creek throughout the day except hour around mid-day.

Periodic maintenance of the stream slopes and habitat expansion zones would be necessary, especially to suppress the expansion of giant reed into all areas planted with native vegetation. Steady eradication of it by all appropriate and acceptable means will be employed so that this invasive pest never occupies more than 2% of the areas planted.

B. **Federally Protected Fish Species in Mission Creek**:

Background:

The biological resources associated with Lower Mission Creek include two fish species protected by the Endangered Species Act, aquatic habitat conditions which sustains their existence in this creek, and the plant growth along its existing banks.

Existing Conditions (Steelhead and Goby):

Lower Mission Creek exhibits purely riverain characteristics through the upper 80% (about 4280 linear feet) of this project area, from Canon Perdido Street to Yanonali Street. The final 1100 feet of the creek become gradually more estuarine, since the daily interchange of fresh and salt water is greater closer to Cabrillo Boulevard. Commercial and residential development which took place historically along this last section of creek now constrain it within a nearly artificial channel: no mudflats dissected by tidal creeks remain anywhere along the estuary. No tracheophyte plant species ecologically associated with functional coastal marine communities remain anywhere along Mission Creek.

Mission Creek historically afforded migratory passage for steelhead to spawning beds located at higher elevations in the watershed. Despite its degraded condition, repeated sightings

each year following the rains of El Niño in 1998 of both adult and probable smolts verify that its lower end continues to be a migratory corridor for steelhead. Adults must enter the creek through the estuary then transit the riverain portion of the creek, both segments where flood control construction would occur. Any young steelhead spawned in the upper waters would do the reverse when of an age to swim to the ocean.

Previous surveys have identified tidewater gobies in the estuary of Mission Creek and the tidal lagoon it forms between Cabrillo Boulevard and the open waters of the harbor. Gobies most likely forage in the estuary, since the silty sediments which gradually accumulate there given existing flow patterns during the dry months offer poor physical conditions for their excavated spawning nests.

Impacts caused by the project (Steelhead and Goby)

Construction between Cabrillo Boulevard and Yanonali Street. The most likely potential cause of adverse effects to steelhead and tidewater gobies will lie in the necessity to dry the streambed and toe of banks prior to construction. The plans for flood control construction would minimize adverse effects to both species through a combination of timing the work to give the best match to the life history patterns of steelhead migration and spawning behavior of tidewater gobies, on-site monitoring for and supervised relocation of both fish species, and means to de-water only half the creek at any one time. Nonetheless, netting and moving fish would affect them in a temporary and adverse manner.

Construction between the oxbow and Canon Perdido Street. Direct mechanical injury of fish or indirect but adverse effects such as impaired respiration caused by greatly increased turbidity could have impacts to steelhead while construction is underway in these upper waters of the project area. Measures to avoid or minimize unavoidable impacts include scheduling construction work outside the migration period, on-site monitoring for and supervised relocation of young salmonids encountered unexpectedly, temporary barricades at the upstream end of sections under construction to exclude smolt sized fish, or temporary use of a pilot channel through the current construction area screened at its upper end to block smolt-sized fish. Any fish netted and relocated would sustain adverse and temporary effects.

Routine channel maintenance. Initial numeric models of sediment transport indicate even less accumulation of fine deposits in the estuary than now occurs. Regular maintenance needs should not arise in the portion of the creek inhabited by tidewater gobies, and therefore this species should not incur adverse effects for channel maintenance.

During winter storms, the creek presently scours pools at bridge abutments, e.g. the upstream side of Bath Street and Highway 101. These persist through the dry season when sufficiently large and sheltered in the shade of the bridge itself. Although an unlikely event, young salmonids who get washed downstream before they are ready to swim to sea and are not yet strong enough to return to waters higher upstream would try to survive in such pools. As a

precaution during the annual maintenance cycle, any young trout holding out in such refuges would be subject to supervised relocation. Steelhead netted and moved for their own well being would sustain adverse and temporary effects nonetheless.

Mitigation Goals:

The probable need to relocate steelhead or gobies from stretches of the creek where construction is imminent becomes a compromise to reduce direct and adverse effects on both species. Supervised relocation would diminish the unwanted risk of dead fish, but would in itself constitute direct take within the realm of the Endangered Species Act (the Act). Authorization for take of this level must be granted by National Marine Fisheries Service for steelhead and by the U.S. Fish and Wildlife Service for tidewater gobies. As compensatory mitigation for any incidental and indirect impacts the project may cause to steelhead and gobies in Mission Creek, elements of the project's design would:

- Minimize adverse effects during construction and subsequent maintenance to steelhead and tidewater gobies;
- implement a design which causes no constriction to the creek bed, and hence no increase of water velocity compared to existing conditions;
- create flow conditions conducive to the passage of steelhead through the length of the project on Mission Creek;
- preclude the chance of steelhead entering the lower end of the proposed by-pass culvert at stream discharges less than the average annual flow, 640 cubic ft/sec;
- provide permanent refuges appropriate to both fish species;
- permanently expand by more than double the estuary's volume; and
- restore an important measure of natural heterogeneity in flow characteristics to the riverain portion of the streambed.

Details on impacts analysis are provided in the Section 10 of the EIS/EIR. Brief discussion on documenting of no permanent adverse effects is provided in the biological assessment for gobies. Details on mitigation measures/environmental commitments are provided in the following paragraphs.

Mitigation Measures/Environmental Commitments to Minimize Project Related Adverse Effects:

If stream flow conditions are suitable, adult steelhead would be most likely to try the ascent during the four month span between December and the end of March. Adolescent steelhead could be present in the creek from the middle of March through late May, on their way to the ocean. Their tenure in the lower creek depends on the speed of changes necessary for them to tolerate salt water after the first phase of life in fresh water. Those complex changes transform them physiologically from young trout into steelhead smolt.

Spawning by tidewater gobies peaks in March and April. They construct egg clutches in gravely substrates, such as that found in the tidal lagoon below Cabrillo Boulevard. Gobies would be expected sporadically in the estuary through summer and fall, but are unlikely to swim upstream of Yanonali Street in the typical flow regime, primarily because a low sill spans the full creek bed at that bridge where water is quite shallow after the rainy season, and secondarily because gobies prefer saltier waters compared to the flow issuing from the sandstone channel consists which entirely of fresh water.

Measures to lessen impacts to both fish species during streambed, toe-wall, and side slope construction would differ from those applicable during annual maintenance. All are inherently geared to the two species' respective behavior which leads to spawning in their respectively different habitats. Some measures appropriate to construction needs in the estuary (where construction would begin) are not appropriate farther upstream, so they are set out here as though in two separate regions. Work in the estuary will necessitate drying half of it at a time, from the center line to one bank, then switching sides for the opposite bank. A temporary construction exclosure is the preferred method for this requirement. While one half the estuary has thus been dried, normal tidal flush and flows regimes of the dry season can still pass through other half. At no time would the complete streambed be dammed. Work from the oxbow up will necessitate temporary diversion of lower flows. The least injurious method entails placement of a buried culvert into a suitable pilot channel and fitting its intake with appropriate fish barriers, and continuous monitoring. The mitigation measures/environmental commitments are identified by the project reach and future maintenance, because of the complexity and timing to avoid impacts to both Federally listed species.

Construction between Cabrillo Boulevard and Yanonali Street:

1. No construction work in water anywhere in the estuary from December 1st to June 1st.
2. Divide a suitable length of the estuary down the middle with an impermeable barrier, perhaps sheet piling. That length should be as long as practicable to minimize repetition of this divide and dry procedure for making temporary construction enclosures. A lateral coffer dam in mid-stream shall not be acceptable because of increased turbidity and fine sediments that would conveyed downstream to the coastal lagoon.
3. Dam half the estuary at the upper end of the center-line barrier with sheet piling.
4. Qualified biologists walk downstream in zigzag pattern to herd as many fish as possible from the incipient exclosure.
5. Dam the lower end of the exclosure with sheet piling immediately.
6. Fish biologists seine the entire confined half thoroughly to remove any gobies and other large organisms to the wet side of the construction exclosure.
7. Commence pumping water from the exclosure with intakes to pump fitted with ½ mesh screens.
8. Fish biologists monitor drying exclosure and seine it thoroughly at least twice a week.
9. When construction on one side has been completed, the downstream wall of the exclosure shall be removed first, followed by the upstream end.

10. Repetition of the steps above on the opposite bank.

Construction between Highway 101 and Canon Perdido Street:

11. No mechanized equipment permitted in flowing water between December 1st and the end of March;
12. Prior to starting work in the next region upstream, a qualified biologist would examine all scour pools at bridge abutments, undercut concrete ledges, etc.
13. Any steelhead, or young salmonid fish in particular, found unexpectedly in these small refuges would be relocated upstream to a receiving area previously identified and agreed upon by NMFS and CDFG and in a manner thoroughly consistent with appropriate transportation techniques. If authorized, the monitor shall weigh, measure, remove a sample of cheek scales, remove a sample of adipose fin, and apply a permanent identification tag of acceptable properties to each salmonid discovered and relocated.
14. The biological monitor shall prepare a written report giving all pertinent details of fish relocated.
15. Silt curtains shall be deployed below the immediate area of construction. Curtains would be deployed in pairs, with a gap at least 30 feet wide between the upstream and the downstream curtain to reduce suspended sediments in the water.
16. A temporary net of appropriate size as agreed upon by NMFS and CDFG shall be strung across the existing low flow channel to prevent salmonids from entering the section of creek next to be constructed.
17. Once certified free of protected fish, the existing current would be diverted to a temporary pilot channel scored in the center of the creekbed.
18. As many culvert pipes as determined necessary to carry anticipated low flows shall be placed into the pilot channel. A mesh filter no larger than ½ inch square shall cover the intake. Culverts shall be at least 24 inches in diameter. Culverts shall not be longer than 100 yards.
19. Once culverts have been placed, the biologist shall monitor each section at least twice a week to verify that screens are in place over intakes and water has not leaked into the local section under construction.
20. Prior to completion of work in a given section, the temporary net shall be resuspended upstream of the culvert intake and fully across the existing low flow channel.
21. Only then shall removal of the culvert and completion of the natural streambed downstream be allowed.
22. The pair of silt curtains shall be removed.
23. The next upstream segment of creek bed and banks shall be readied in like manner.

STRUCTURAL FEATURES TO MITIGATE PROJECT RELATED ADVERSE EFFECTS :

Design features of the project include a number of elements intended to offset incidental but adverse effects to steelhead and tidewater gobies. Broadly, these elements would improve habitat conditions for both species. They are summarized in the following table and more detailed descriptions follow that.

All impacts to either fish species would be of temporary nature. The project would not permanently reduce net reproductive rate ($R_0 \approx \int l_x m_x dx$), age-specific survivorship (l_x), age-specific fertility (m_x) or dispersal ability of either species. Table 6 of the biological assessment for steelhead summarizes implementation of each structural features to mitigate adverse effects to steelhead and tidewater goby and indirect benefits generated by each feature.

The following paragraph summarizes benefits and analysis of the structural features (refer biological assessments for details).

- **Increase of Natural bottom**. The creekbed would be widened therefore project design would yield approximately 4.4 acres of streambed, compared to 2.3 acres of an existing streambed. In total, approximately 4450 linear feet of streambed would be surfaced with native sediments.

- **Larger Estuary**. Expansion of the creek bed to a width of 60 feet will create greater surface area in the estuary. Compared to existing conditions, gobies would have approximately 2¼ times as much water in which to forage between Mason Street and Cabrillo Boulevard.

- **Fish refugia in the estuary**. The project would provide permanent and durable hiding places for fish. Both toe walls and full-height vertical walls would be formed with a coarse surface ornamentation, artificial overhangs, and double rows of coarse boulders between the overhangs where fish may take refuge. Walls throughout the estuary would have both these molded features.

- **Mid-stream boulder clusters**: Placement of clusters within the baffle field (accompanying diagram) is intended to promote the variety of water conditions trout seek out in natural streams, so clusters would be placed to outline a sinuous and meandering predominant channel, one that shifts back and forth across the streambed.

- **Fish baffles upstream of Mason Street.**

Fish baffles would occupy locations in lower velocity sections of the creek, on one side or the other as appropriate to its curvature. In certain lengths of the creek side baffles would be placed along one side only, then for another length be built against the opposite side. Many baffles would extend along 150 feet of the creek's side, a few up to 200 feet in length, while

others would be shorter by necessity. Design restrictions prevent their placement beneath bridges, for a certain distance on the upstream side of bridge abutments, and directly opposite other baffles or ledges.

The creek's channel allows fish baffles to be interspersed with ledges as indicated by the prevailing direction of currents and streambed to encourage formation of varied stream features are attached in preliminary design attachment. Side baffles would be installed over approximately 1400 linear feet of the stream's edge; 675 linear feet of fish baffles on the left and 725 linear feet on the right side.

CONSTRUCTION OF UNDERGROUND OXBOW CHANNEL.

The project incorporates a box culvert. The culvert will extend between the upper end of the oxbow and the Yanonali Street Bridge, roughly 830 feet long. The culvert and the existing watercourse will reunite immediately below that bridge. Except where it passes under Highway 101and is open to the air, the first 200 feet of its full length, about 75% of the box culvert would be buried and completely dark, including the downstream end of the structure.

In actuality, the existing watercourse and the culvert must function as paired alternative channels which accomplish two separate needs. First, the existing oxbow must behave as the sole channel for all discharges less than the yearly average event (640 ft^3/sec, a recurrence interval of 2.3 years), i.e. the culvert cannot begin to accept any water until flows exceed 640 ft^3/sec. Secondly, when discharges exceed that threshold, the water's momentum must carry it toward the culvert preferentially and away from the oxbow to counteract the existing route's tendency to take on flows in excess of the limiting conveyance capacity, i.e. flows larger than 1050 ft^3/sec must be captured by the culvert. At the design limit, the culvert will shunt as much as 2350 ft^3/sec past the existing channel while 1050 ft^3/sec pass through the oxbow. Details of oxbow related consequence are provided in the biological assessment for steelhead.

FUTURE MAINTENANCE RELATED MITIGATION MEASURES:

Detailed descriptions of the sediment deposition and future maintenance are provided in Section 3 of the EIS/EIR.

Mitigation Goals:

a) Restoration of natural streambed to the greatest practicable extent;
b) Promote heterogeneous current conditions;
c) Areal expansion of estuarine habitat;
d) Reduce siltation within the estuary;
e) Restrict growth of non-obstructive plants, but not suppress it;
f) Enhance conditions to promote growth of instream invertebrate fauna and decomposers.

Mitigation Measures:

- All routine maintenance shall be accomplished between August 1st and October 31st;
- A pair of silt curtain fences shall be set across the low flow not more than 100 yards downstream of the work area;
- the fences shall be approximately 10 yards apart;
- Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and California Fish and Game and relocated promptly to a suitable refuge;
- A written report describing in detail any such relocations would be submitted to National Marine Fisheries Service;
- Mechanized equipment would enter the creek via the access way at the parking lot of the church at Canon Perdido Street, that at Cota Street, or that immediately adjacent to the oxbow;
- A front end loader or road grader working together with dump trucks (10 yd^3) would be used for the bulk of sediment and vegetation removal;
- A swath half the channel wide shall then be cleaned, first along one side as seems convenient for an arbitrary distance (say, 250 feet), then switching to the opposite bank for another arbitrary distance;
- The half of the streambed from which sediments are removed shall be completed by scoring a pilot channel as close as practical to the side baffles or ledges without hitting them and chamfer that dressed side gently from the center line to the pilot channel;
- Vegetation in the other half shall be mowed to suppress the growth of woody perennials but still allow herbaceous perennials and annuals to grow;
- If storm events of the next winter rains leave enough sediments to warrant their removal, then during the following summer the other half of the creek bed, that where only brushing of plants occurred the previous year, would be groomed to remove obstructing sediments and plants, and to shift the chamfer and the pilot channel to the opposite side;
- If storm events do not reduce conveyance more than 15% then the next maintenance cycle shall involve only mowing of vegetation.

ENVIRONMENTAL COMMITMENTS FOR MAINTENANCE OF THE STRUCTURAL FEATURE:

Maintenance of side baffles, ledges, and mid-stream boulder clusters —

- Sediments would be removed from among boulder clusters and large rocks of the side baffles only as needed to prevent them from being covered completely;
- If necessary, sediments shall be dug from the downstream side of boulders with a backhoe equipped with a 3 foot bucket, then dragged toward the center of the creek to be combined with streambed sediments being removed as described previously;
- Any individual boulders that might have been dislodged mechanically or displaced by currents would be pushed back into a suitable vacant spot in the baffle and reset.

- Any propagules of giant reed or salt cedar that have taken root shall be eliminated. A combination of foliar application of glyphosate or digging out rhyzomes with hand tools could be employed. Application of herbicides should be very limited, confined to only those small locations where the most persistent and aggressive weedy plants begin to re-invade the creek bottom;
- The remaining growth shall be cut back using a brush hog, or similar mowing attachment passed a couple feet over the tops of the rocks. The intent is to cut down woody species before they attain much height or stem expansion, but not to eradicate low-growing herbaceous plants that offer negligible friction to water currents.

Maintenance Expectations Between the Oxbow and Sandstone Channel:

- The weir's height would push all flows smaller than 640 ft^3/sec toward and through the sandstone channel. In effect, the pattern by which sediments currently settle in the sandstone channel would remain unchanged.

- Removal of silts and vegetation between the Highway 101 bridge and through the sandstone channel would continue to follow current practices.

- Sediments and vegetation would be removed when channel capacity has been reduced by more than 15%.

- All routine maintenance shall be accomplished between August 1st and October 31st.

- A qualified biologist would examine all pools at bridge abutments for young trout.

- Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and the California Department of Fish and Game and relocated promptly to a suitable refuge.

- A double line of straw bales or silt curtain shall be set across the lower end of the channel.

- A front-end loader would scoop all materials directly from the channel to trucks waiting above adjacent to the railroad tracks.

- The full width, 33 feet, would be cleaned of obstructive materials.

Monitoring Requirements for the Future Maintenance:

- Monitor sedimentation and vegetation growth within the creek. Sediments and vegetation would be removed when channel capacity has been reduced by more than 15%.

- A qualified biologist would examine all pools at bridge abutments for young trout.
- Mechanized equipment necessary to perform maintenance activities can be used in the creek between August 1st and October 31st.
- A biological monitor shall examine all suitable pools for salmonid fish.
- Pools formed beneath fish ledges which need not be touched during channel maintenance shall be excluded from this monitoring requirement.
- Dip nets, or larger seine shall be used for this purpose. Electroshocking shall not be acceptable.
- Any salmonids discovered in the lower creek during annual maintenance shall be dealt with as described in the biological assessment.

MAINTENANCE EXPECTATIONS WITHIN THE ESTUARY:

Projections of sediment transport indicate greater erosion from storm events than currently takes place. During storms, water entering the culvert would carry less sediment than it could by virtue of the blocking effect of the weir. When flows through the culvert and sandstone channel converge, this volume of cleaner water would resuspend fine sediments. Hence, the net effect of the project within the estuary should shift the composition of the streambed to gravels and small rocks, rather than fine silty sediments. Removal of silty materials or other fine sediments from anywhere in the estuary should not become a maintenance requirement of the project.

IV. WATER QUALITY:

Section 7 of the EIS/EIR provides detailed on existing and impact analysis of water resources. Following paragraphs summarize mitigation and monitoring requirement for the project construction and future maintenance.

The USACOE does not issue itself a permit for civil works projects. Therefore, a Section 404 (b)(1) analysis is prepared and included in the EIS/EIR, Appendix F. Section 404(b)(1) addresses project related impacts to the waters of the United States. A future maintenance plan is included in the EIS/EIR, and impacts related to future maintenance are identified. Mitigation measures for project construction and future maintenance for the life of the project are included in the EIS/EIR for water. Future maintenance will be performed by the Local Sponsor. Therefore, Santa Barbara County has submitted an application for a Section 404, Corps Regulatory, permit. The Environmental Resources Branch has coordinated with the Regulatory Branch, Ventura Field Office, on the requirement for the Section 404, Water Quality General

Permit. The USACOE is planning to coordinate with the Regulatory Branch throughout construction of the proposed

project. A public notice will be issued, and, if necessary, an opportunity for a public hearing for the proposed discharge, will be issued. A Section 404, Water Quality Permit could be vaived, becuse the EIS/EIR would be sumbitted to Congress for re-authorization.

The USACOE has received a Section 401, State Water Quality Certification, waiver for the project construction and future maintenance from the California Water Quality Control Board. As identified in Section 404(r) regulation: "The requirement to obtain Section 401 Water Quality Certification for the project construction is waived if information on the effects of the discharge of dredged or fill material into waters of the United States, including the Section 404 analysis, is included in an EIS/EIR submitted to Congress before Congress authorizes the project or appropriates funds for construction."

MITIGATION OF POTENTIAL WATER QUALITY IMPACTS:

- The creek channel upstream of construction activity shall be dammed temporarily to prevent water from entering the reach under construction. A diversion pipe shall be installed in the dam to convey any creek water around the construction area for discharge downstream of the construction activity

- Short-term impacts to surface water quality from fuels, solvents, and lubricants associated with construction equipment.

- Equipment shall be in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work. Corps shall develop and implement a spill prevention and remediation plan and workers shall be instructed as to its requirements. Construction supervisors and workers shall be instructed to be alert for indications of equipment-related contamination such as stains and odors. Construction supervisors and workers shall be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan if indications of equipment-related contamination are noted. Construction equipment shall only be operated within dewatered areas of the creek. No maintenance of construction equipment shall be carried out in the creek bed.
  No construction or sediment removal would occur anywhere within the project area between December 1st and March 30th. Details of these mitigation measures include:

    1) Pipe culverts will be placed in the low flow stream where the stream must be crossed on a regular basis. No work will be allowed in the flowing water except as absolutely necessary (as determined by the Flood Control District).

2) Construction of temporary low-flow channels within the creek during debris removal operations to minimize turbidity and provide habitat for aquatic species.

The low-flow channels would be constructed around and away from debris removal operations. Project biologists would develop criteria for the low-flow channels.

3) Conditions identified in the applicable permits and 1601/1603 Streambed Alteration Agreement) shall be followed during construction and future maintenance as applicable.

- Stockpiled soil needs to be placed sufficiently far back from the creek that erosion control measures can be employed. During construction, USACOE intends to employ Best Management Practices (BMPs) to control erosion and associated sedimentation of the creek. Measures such as use of sediment control mesh and covering of stockpiles are among possible BMP's that would be employed to protect the creek. A Storm Water Pollution Prevention Plan (SWPP) will be prepared by the USACOE or the Construction Contractor, which would include methods or conditions for erosion control occurring due to the project construction. This document would be available on the construction site.

MITIGATION MEASURES FOR FUTURE MAINTENANCE:

- All routine maintenance shall be accomplished between August and mid-October.
- A pair of silt curtain fences shall be set across the low flow not more than 100 yards downstream of the work area; the fences shall be approximately 10 yards apart.
- If storm events do not reduce conveyance more than 15% then the next maintenance cycle shall involve only mowing of vegetation.
- During those maintenance cycles when the County determines silt removal has become necessary, all plants and deposits would be removed. As the final step during maintenance, the pilot channel would be rebuilt following the path where a natural channel had gradually come into being, or where the pilot channel had been if hydraulic processes have not already shifted and reshaped it.
- A swath half the channel wide shall then be mowed or brushed to suppress the growth of potentially large perennials, first along one side as seems convenient for an arbitrary distance (say, 250 feet), then switching to the opposite bank for another arbitrary distance. The pilot channel would not be disturbed.

- If sediment removal is not needed the year after, then the other half of the channel would be mowed and brushed. The pilot channel would not be disturbed.

- If storm events of the next winter rains leave enough sediments to warrant their removal, then during the following summer the full width of that section of the creek would be groomed to remove obstructing sediments and plants. The pilot channel would be rebuilt where a natural channel had gradually come into being, or where the pilot channel had been if hydraulic processes have not already shifted and reshaped it.

- No discharge of oil or spill of contaminated material should be allowed within the creekbed (conditions identified above would be followed during the future maintenance.

- BMPs will be employed to avoid excessive impacts to water quality.

APPENDIX - H (for Alternative 12)
SUMMARY TABLE
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Water Quality	Minor short-term increase in turbidity levels during construction and future maintenance.	- Stream water diversion shall use pipes/ pilot channel and other standard methods to create low flow diversion channel during construction and future sediment removal. - No construction or sediment removal shall occur in flowing water or during heavy rains. Construction and future maintenance shall not occur during months of December 1 through April 1, when flow is high in the creek . - Conditions identified in the Water Quality Certifications shall be followed during construction as well as for future maintenance. - No discharge/leaks or spills of fuels, solvents or lubricants in the creek bed. A Storm Water Pollution Prevention Plan (SWPP) shall be required prior to project construction and implemented.	Construction: from initiation of construction to completion of construction. Future Maintenance: Between July and November	Construction: USACOE or Construction Contractor. Future Maintenance: Santa Barbara County or Contractor	Construction Approx. 2-years or until construction is completed Future Maint. About 15 to 30 days; every year for the life of the project.	In the beginning every week; once construction is established once a month until construction is completed Future maintenance : Once a week.during each maintenance cycle.	As conditions identified in permits , EIS/EIR. and Mitigation Monitoring Plan

Note: Only, resources are included in this table which require mitigation measures or environmental commitments and monitoring. Details are provided in the Mitigation Monitoring Plan text and EIS/EIR.

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Air Quality	During construction and future sediment removal, short term increase in fugitive dust; no long term impacts on air quality.	Construction: Water the excavation site, storage piles and unpaved roads twice each day of construction; once in the morning and at the end of the construction day; cover material transported in haul trucks; these conditions are applicable for construction and future maintenance. Limit vehicle speeds to 15 mph maximum within the construction site and maintenance areas (construction and future maintenance). Cease grading and earth movement when wind speeds exceed 20 mph, or as confirmed by SBCAPCD during construction and future maintenance activities. Future Maintenance: Same as Construction	Construction: from initiation of construction to completion of construction. Future Maintenance: Between July and November	Construction: USACOE or Construction Contractor. Future Maintenance: Santa Barbara County or Contractor	Construction Approx. 2-years or until construction is completed Future Maint. About 15 to 30 days; every year	In the beginning every week; once construction is established once a month until construction is completed Future maintenance: Once a week during each maintenance event.	As directed by the Santa Barbara County Air Pollution Control District.

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Noise	Short term increase in noise levels due to use of the construction equipment and truck traffic. Noise levels will exceed 65 dBA at sensitive receptors. Residents located in the vicinity of the project area will experience increased noise levels during construction as well as during future maintenance.	Construction and future maintenance: Follow noise ordinance of the City of Santa Barbara. The project area is located within densely populated area; therefore, no loading or unloading of equipment or material shall be performed between 7:00 p.m. and 7:00 a.m., nor shall there be any heavy equipment operation prior to 8:00 a.m. and after 7:00 p.m. Monday through Saturday. No Sunday or holiday operation. Truck traffic shall be on designated truck routes established in coordination with the City of Santa Barbara.	Construction: from initiation of construction to completion of construction. Future Maintenance: Between July and November	Construction: USACOE or Construction Contractor. Future Maintenance: Santa Barbara County or Contractor	Approx. 2-years or until construction is completed Future Maint. About 15 to 30 days; every year	In the beginning every week; for a month; if complains received than continue monitoring every week otherwise every two months or after a complain received from the citizens. Future maintenance: Once at every event.	Follow City's local noise ordinance guideline.

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Biological Resources							
Steelhead	Temporary impacts would be incurred by: the possible need to capture and relocate steelhead smolt from reaches of the stream where construction is about to begin, temporary alteration of instream habitat conditions, temporary loss of macroinvertebrate populations, increase turbidity downstream of construction areas.	No construction within flowing water between December 1 and March 31 to avoid impacts to adult steelhead. Qualified biologist would survey the area for steelhead prior to construction. Construction in the estuary restricted to period between June 1st and December 1st. Placement of ledges, rocky side baffles, mid-stream boulder clusters, construction and alignment of pilot channel, and natural bottom throughout to promote higher quality of instream habitat, especially during steelhead migration. **Note: All environmental commitments/mitigation identified in Mitigation Monitoring plan, EIS/EIR and Biological Opinion must be followed.**	Construction: from initiation of construction to completion of construction. Future Maintenance: Between August 15th and October 31st.	Construction: USACOE or Construction Contractor. Future Maintenance: Santa Barbara County or Contractor	Approx. 2-years or until construction is completed Future Maint. About 15 to 30 days; every year	In the beginning every week; for a month; depending upon water level in the creek, during construction of low-flow channel or installation of pipe, during heavy rainfall. Future maintenance: Once per year under normal circumstances.	Construction determined by the National Marine Fisheries Service, follow conditions identified in the biological opinion. Future Maintenance: Same as construction

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Biological Resources - Continued							
Tidewater Goby	Incidental and temporary impacts would be incurred by: the possible need to capture and relocate gobies from the half of the stream channel to be de-watered prior to construction between Cabrillo Boulevard and Yanonali Street, temporary alteration of instream habitat conditions, temporary contraction of the estuary to about half its existing size, temporary loss of macroinvertebrate populations, increase turbidity downstream of construction areas.	Tidewater gobies would be excluded from half the estuary at a time, and fish moved to the wet half while construction zone is dewatered slowly. Structural designs of walls to create permanent habitat features suitable for gobies, small fish, and macroinvertebrates; expansion of estuary by 220%. **All environmental commitments identified in the Mitigation Monitoring Plan, EIS/EIR and Biological Opinion has to be followed for the project construction and future maintenance.**	Construction: from initiation of construction to completion of construction.	Construction: USACOE or Construction Contractor.	Approx. 2-years or until construction is completed	Construction in estuary: after assembling the temporary exclosure and while dewatering it full time monitoring, twice a week thereafter.	Constructio n: 90% As identified in the biological opinion and coordinatio n act report.
			Expectations of maintenance requirements in the estuary, i.e. between Yanonali Street and Cabrillo Boulevard: Historically, no need to remove sediments or extract large debris after flood events has ever arisen within this portion of the creek. The proposed design would not change hydraulic influences within the estuary. Therefore, no future channel maintenance of the estuary should be necessary under normal circumstances.				

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Biological Resources - Continued							
Aquatic habitat	net incidental environmental benefits equivalent to 0.34 habitat units in comparison to the future without project.	Mosaic procedure for mowing or brushing streambed vegetation; strategic placement of boulder clusters as energy dissipaters; soft bottom throughout flood control project; projecting ledges to be placed in conjunction with permanent pilot channel; when sediment removal becomes necessary, pilot channel to be reconstructed to follow evolved low-flow alignment; fish baffles along toe walls; expansion of estuary by 220%. **All conditions identified in the Mitigation Monitoring Plan, EIS/EIR and Biological Opinion must be followed for the project construction and future maintenance.**	Construction: from initiation of construction to completion of construction. Future Maintenance: Between August 15th and October 31st.	Construction: USACOE or Construction Contractor. Future Maintenance: Santa Barbara County or Contractor	Approx. 2-years or until construction is completed Future Maint. About 15 to 30 days; every year	Annually after completion of the project	100% or as identified in the biological opinion or directed by the NMFS and USFWS.

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Biological Resources Continued							
Isolated Native Trees	Loss of 15 to 18 individual trees.	Planting species native to riparian habitats, including western sycamore from local genetic stock, into riprap slopes and habitat expansion zones would yield at least 300 replacements.					
Stream Bank Vegetation	Projected average environmental quality equivalent to about 1.1 habitat units. Incidental environmental benefits equivalent to 0.34 habitat units in comparison to the future without project.						
Planted* Vegetation along riprap and habitat expansion zone		A temporary, above ground irrigation systems shall be installed and maintained. Invasive weeds (principally giant reed, castor bean, salt cedar, and sweet fennel) removed mechanically or by spot application of herbicide during maintenance. Any native trees which die within the first five years shall be removed and replaced by the same species from 1-gallon stock.	Construction: After completion of the project construction. Future Maintenance: After two years of completion of the project.	USACOE or Construction Contractor for five years of planting; after five years Santa Barbara County will monitor for the life of the project.	for five years to ensure that planted trees/vegetation established. Twice a year for the first two years, and annually for the next three years. Ensure that criteria identified are met.	Monitoring of the planted vegetation performed twice a year for five years - USACOE or Construction Contractor until success criteria met. Santa Barbara County for the life of the project.	After a year of planting 40% success, after two years 55% success, and after five years 90% success. Dead or dying plants to be replaced during regular maintenance of areas planted.

***Note: Planting along riprap slopes and in habitat expansion zone is part of the project design. It is not a mitigation measure. Planted vegetation would be monitored to document success of planted vegetation.**

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Land Use	(1) No impacts to agricultural lands, Long-term Permanent Impacts: Buildings or property located within the project right-of-way will be removed or demolished for project construction. Therefore, land use would change from residential to natural creek bed or open space. However, most of the buildings located within the project reach are very old and all property located within the flood plains is subject to severe flood damage during heavy rains or flooding. Land use will change from residential to natural creek bed or open space within the construction right-of-way. (2) This alternative would require demolition of 10 complete and 3 partial structures. Relocation of existing tenants may be difficult due to the cost of housing. No impact to oxbow area. Culverts would be installed away from the creek. During construction, temporary impacts near fig tree.	The local sponsor will purchase the property and provide compensation to the property owner and tenants and/or property will be relocated	Prior to initiation of project	Santa Barbara County	About six months or negotiation is completed with the property owner.	One time - prior to the project construction.	As identified in state and local regulations for the property acquisition.

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Socio-economics	(1) Long Term Impacts: Some of the property located along the creek bank would be removed. There would be economic loss to the property owner. However, property located within the flood plain would be protected from flooding hazards in future. Demolition of structures/building refer to Land Use Section. Relocation of existing tenants may be difficult due to the cost of housing. (2) Alternative 12 would require removal of 10 full structures and 3 partial. See details on type of the structures in Land Use Section.	The local sponsor would purchase the property or relocate the housing or commercial units to a safer zone. The property owner would receive compensation equal or more to their property value; therefore, project related impact is not significant. All property removal would be fully mitigated.	Prior to initiation of the project construction	Santa Barbara County.	About six months.	One time-prior to the project construction.	As identified in state and local regulations for the property acquisition.

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Aesthetics	(1) Short-term: During construction, equipment and stockpile material would degrade aesthetic value of the project area. However, this impact is short term and would not be significant. (2) Long Term: Aesthetics/visuals of the creek banks would be improved with stabilization of banks. .Implementation of this alternative will provide maximum aesthetic value. Creek will be more natural looking. Provides maximum vegetation cover. Bottom of the creek can not be seen from top because riprap will be planted with native and riparian vegetation. Aesthetic treatment would be provided to the vertical walls. (3) For safety reasons, some type of fencing shall be installed along the banks. If chain-link type of fencing is used, aesthetic treatment would be needed, including planting of vines to reduce impacts.	**Alt. No. 12**: Upper banks will be planted with the natural vegetation. Create pocket parks. To enhance environmental value, construction of wetland near oxbow area would be performed. **Vertical Walls**: Plant vines along the vertical walls to minimize impacts; cover concrete with natural color and texture. If fencing is installed in the project design for safety purposes, plant vines along fencing to minimize impacts. Upgraded fence materials shall be used in areas visible or accessible to the public.	After stabilization of the side-slopes.	USACOE or Construction Contractor. Future Maintenance: Santa Barbara County (repair of the damaged banks)	About two years Future Maintenance: For the life of the project.	Inspection every year, and if damage is reported repair would occur on needed basis.	Not applicable.

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Recreation	Short-term: During construction, stock piled material, equipment etc. will restrict recreational use of the creek. However, all sections would not be constructed at the same time; therefore, this impact is temporary and not significant. Long-term impacts: This alternative provides maximum recreational opportunity compare to other alternatives. These opportunities include: bird watching, walking along the creek bank, enjoying natural vegetation planted on upper slope of the creek. However, access to the creek bottom will be restricted and the creek's use as a connective corridor will be lost.	Alt. 12: Planting of native and riparian type of vegetation along the upper slope of the creek banks and within open areas. Create habitat expansion zones (pocket parks) and construction of wetland at oxbow.	After completion of the project.	Initial responsibility is of USACOE or Construction Contractor. Future Maintenance: maintain sideslope and habitat expansion zone by Santa Barbara County.	Approximately a year after completion of the project, Future Maintenance: For the life of the project.	One time after completion of the project. Future Maintenance: as needed basis for the life of the project.	Not applicable.

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
*HTRW	Two HTRW sites are located within the project reach, at 324 De la Vina and 220 W. Gutierrez Streets. The De la Vina property was used by former dry-cleaning establishment. Testing of sediments would be required at West Gutierrez Street. Sediment contamination by construction equipment-related leaks or spills of fuels, solvents, or lubricants; possibility of encountering PCE contaminated soil and/or shallow groundwater in the vicinity of the West Gutierrez Street Bridge. This event could potentially cause releases of this substance to the environment; and, possibility of encountering deep sediment contaminated by HTRW.	(1) Equipment shall be in proper condition; no gasoline or oil change shall occur in the creek bed. Prior to construction, samples of creek sediments will be analyzed to determine contamination. Plan will be developed in coordination with the regulatory agencies (RWQCB, County Department of Environmental Health Services). (2) If sufficient information is available, a work plan shall be developed to determine characterization of the plume and impact to the shallow groundwater and sediment testing.	(1) Construction: from initiation of construction to completion of construction. (2) When construction occurs in vicinity of 324 De la Vina and 220 W. Gutierrez Street. Future Maintenance: at every maintenance activity	Construction: USACOE or Construction Contractor Future Main.: Santa Barbara County	Construction: Approx. two years. Future Maintenance: About 15 to 30 days for the life of the project	Construction: Initially every week, after construction is established once a month until construction is completed. Future maintenance: Once when maintenance is initiated.	As directed by the WQCB.

*** Hazardous Toxic and Radioactive Waste (HTRW)**

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Traffic	Short-term/Long-term: During project construction and future sediment removal, some residents may not have direct access to their residences. Street closure would be required in some locations. This impact is a short-term, temporary increase in truck traffic along selected haul routes. Particular concerns would arise during the replacement of the De la Vina/ Haley Street bridge which would impact a major commuter route on Haley Street.	Project construction would be performed by sections. No access to the residents or commercial establishment would be eliminated. Appropriate detours and traffic control officers would be provided to direct traffic. Alternative routes shall be coordinated with the City of Santa Barbara.	Construction: Throughout the project construction. Future maintenance: Between July and November every year	Construction: USACOE or Construction Contractor. Future Maintenance: Santa Barbara County	Construct. Appro. two years. Future Maintenance Approx. 15 to 30 days for the life of the project.	Construction: Initiation of construction every week; once a month until project construction is completed. Future Maintenance: Once during maintenance activities.	As determined by the City of Santa Barbara

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Safety	Short-term Impacts: During construction, truck traffic will increase, potentially causing accidents. Long-term Impacts: After completion of the project, it could be possible that people could enter within the creek bed and injured. In addition people may get into by-pass tunnel and criminals may live and hide in culvert.	Short-term Impacts: During construction, traffic control officers would be provided to divert traffic to minimize accidents. Long-term Impacts: Fencing or other type of the protection shall be provided for public safety. Access points shall be provided to facilitate safe rescue. Install bars at end of tunnel to restrict passage to people (applicable to oxbow bypass Alts)	Construction From initiation of the project construction. Future Maintenance: Between Months of July and November	Construction: USACOE or Construction Contractor. Future Maintenance: Santa Barbara County	Construction Approx. Two years. Future Maintenance: Approx. 15 to 30 days at every year for the life of the project.	Construction Initially once a week, after construction is established once a month. Future Maintenance: Once during each event.	Not applicable.

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Cultural Resources	No National Register listed or eligible properties will be impacted under NEPA. Additional structures impacted under CEQA: A. 15 W. Mason St. - Proposed for removal. B. Potter Hotel Footbridge - Proposed for removal. C. 134 Chapala St. - Proposed for partial removal. D. 434 De la Vina St. - Proposed for removal. E. 306 W. Ortega St. - Proposed for removal. F. 536 Bath St. - proposed relocation. G. 116 Chapala Street. Proposed for removal	No mitigation is required under NEPA. Mitigation Under CEQA: 1. Extend box culvert downstream of Chapala Street Bridge. 2. Same as #1. Depending on design, may not mitigate to less than significant. 3. Realign proposed channel or relocate house on-site. 4. Relocate on-site. If not feasible, relocate off-site & complete biography of Karl Obert. Relocation off-site results in significant unavoidable impacts. 5. & 6. Save buildings on-site. Complete survey to determine boundaries and contributing elements. A. HABS recordation. Significant unavoidable impact. B. See #1. HAER recordation & relocation would result in significant unavoidable impact. C. HABS recordation, photographic study & short history. D. Same as C. E. Begin vertical wall further upstream or otherwise redesign to avoid house. Also acceptable, HABS recordation & relocation on-site.	Construction: Prior to initiation of the project. Future Maintenance: Not applicable	Undert NEPA the Corps has no responsibility. CEQA: City of Santa Barbara and County	Not determined yet.	Once prior to the project construction Future Maintenance Not applicable	N/A under NEPA CEQA: As identified by State and Local agencies

APPENDIX - H (for Alternative 12-Continued)
SUMMARY
MITIGATION MONITORING TABLE
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Resource	Description of Impact	Environmental Commitment/Mitigation	Start Date or Event	Responsible Party	Duration	Frequency	Level of Success Expected
Utilities	Water, sewer and telephone lines are located within the project reach. Relocation of these utility lines would be required. Residents may experience temporary loss of services for short periods.	Relocation of utility lines would be performed in such a manner as to minimize disruption in service and accidental spills. If there is disruption, property owners and tenants will be notified	Construction Prior to the initiation of construction. Future Maintenance: Not applicable	Santa Barbara County or utility companies	Not determined yet	Once prior to construction	As identified in specification of the City of Santa Barbara and guideline for relocation of utilities.

APPENDIX - I

PUBLIC INVOLVEMENT (NOI/NOP/Initial study)

LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

October 1, 1998

Office of the Chief
Environmental Resources Branch

Director,
U.S. Army Records Management Program Division
Records Management Program Services
ATTN: TAPC-PDR-P, Mr. Greg Showalter
6000 6th Street, Stop C55
Ft. Belvoir, Virginia 22060-5576

Dear Sir:

The enclosed Notice of Intent (NOI) is submitted to your office for publication in the Federal Register in compliance with the Council on Environmental Quality final regulations implementing the procedural provisions of the National Environmental Policy Act of 1969, 42 U.S.C. 4321, as amended.

The Los Angeles District is submitting three signed copies of the NOI for the Lower Mission Creek Flood Control Project, Santa Barbara, California (Enclosure).

Thank you for your assistance in providing direction to my staff. If you have any questions, please contact Ms. Joy Jaiswal, Technical Manager, at (213) 452- 3871.

Sincerely,

John P. Carroll
Colonel, Corps of Engineers
District Engineer

Enclosure

[Federal Register: October 13, 1998 (Volume 63, Number 197)]
[Notices]
[Page 54681-54682]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr13oc98-58]

DEPARTMENT OF DEFENSE

Department of the Army, Corps of Engineers

Intent To Prepare a Draft Environmental Impact Statement/ Environmental Impact Report (DEIS/EIR) for the Lower Mission Creek, Santa Barbara, CA

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice of intent.

SUMMARY: The Mission Creek drainage area is located in and adjoining the city of Santa Barbara, California, about 100 miles northwest of the City of Los Angeles. The drainage area, comprising about 11.5-square miles, is a narrow coastal area and extends from the Santa Ynez Mountains on the north to the Pacific Ocean on the south. Mission Creek rises at about 4,000 feet elevation and flows about eight miles through the City of Santa Barbara to empty into the Pacific Ocean. The primary study area for the proposed project extends from Canon Perdido, downstream to the Pacific Ocean. The length of the project construction area is about 1.2 miles.

ADDRESSES: Commander, U.S. Army Corps of Engineers, Los Angeles District, Environmental Design Section, CECSPL-PD-RL, P.O. Box 532711, Los Angeles, CA 90053-2325.

FOR FURTHER INFORMATION CONTACT:
Ms. Joy Jaiswal, Technical Manager, phone (213) 452-3871, or Mr. Edward Demesa, Study Manager, phone (213) 452-3796. The City of Santa Barbara Point of Contact is Ms. Janice Hubbell, AICP, Project Planner, phone (805) 564-5470.

SUPPLEMENTARY INFORMATION:

1. Authorization

The Lower Mission Creek, Flood Control Project is authorized under Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), approved October 23, 1962. The U.S. Army Corps of Engineers (USACOE), in cooperation with the County Flood Control District and the City of Santa Barbara, will be conducting a feasibility study for solutions to the flooding problem along Lower Mission Creek. The study will identify, describe, and evaluate alternative plans and fully develop the recommended plan to be submitted to Congress for project authorization.

2. Background

The USACOE has been involved in this project since 1964. Lower Mission Creek, especially downstream from Carrillo Street, poses a

serious flood threat to the City. In this area, a mix of residential, commercial, and public properties are subject to major damages during floods. The USACOE and the City of Santa Barbara are planning to prepare a Draft EIS/EIR to address and evaluate impacts to the environmental resources due to the improvement/construction along Lower Mission Creek. In addition, alternative solutions and recommendations to the flood and associated problems will be included with consideration to economic, environmental and social needs of the area. In the past, public workshops have been conducted to identify the public's concerns regarding the proposed project construction. Public concerns were about aesthetics of the creek, impacts to the biological resources and recreation. The tidewater goby (Eucyclogobius newberryi), Federally listed as threatened, has been identified in the lower-most portion of Mission Creek. Steelhead (Oncorhyncus mykiss, Federally endangered) of undetermined genetic origin also use the downstream reach of Lower Mission Creek as a channel for migration. although sporadic in their ascent of Mission Creek from the ocean, their irregular presence in this watershed has recently been verified.

3. Proposed Action

Construction of a flood control channel at Lower Mission Creek, Santa Barbara, California.

4. Alternatives

a. No Action: No improvement of the Creek.
b. Proposed Alternative Plans: The proposed plan would provide up to 3400 cfs (20-year flood protection) and consists of creek improvements from Canon Perdido Street to the Pacific Ocean. The improvements would include stabilized banks at a 2:1 (V:H) slope above U.S. Highway 101, while below U.S. Highway 101, vertical walls would be the dominant bank treatment with a sloped bank applied whenever practicable. A variety of sloped bank stabilization methods will be considered, which includes stabilization of sideslopes using gabions, engineered earth, and/or stepped concrete walls. In order to increase the conveyance capacity of the creek, the alternatives would incorporate a new covered channel cutting off the ``oxbow'' area from just above U.S. Highway 101 and rejoining the creek near the Chapala Street bridge. The improved channel would generally follow the existing channel alignment except at the ``oxbow'' bypass. The ``oxbow'' would be left in place functioning as a low flow channel. The majority of the 12 bridges within the project reach except for Bath Street bridge and State Street bridge would require some modification or reconstruction.

5. Scoping Process

a. Potential impacts associated with the proposed action will be evaluated. Resource categories that will be analyzed are: land use, physical environment, geology, biology, air quality, water quality, groundwater, recreational usage, aesthetics (visual quality), noise, cultural resources, transportation/circulation, hazardous waste, socioeconomic (including) housing and safety.
b. Participation of affected Federal, State, and local resource agencies, Native American groups and concerned interest groups/ individuals is encouraged in the scoping process. A Public Scoping Meeting will be held October 29, 1998. Time and location of the Public Scoping Meeting also will be announced by means of a letter, public announcements, and news releases. Public participation will be especially important in the environmental analysis by providing assistance in defining the scope of analysis in the EIS/EIR; identifying significant environmental issues and impact analysis in the EIS/EIR; and providing useful information such as published and unpublished data, personal knowledge of relevant issues, and

recommending mitigation measures associated with the proposed action. Those wishing to provide information or data relevant to the environmental or social impacts that should be included or considered in the environmental analysis can furnish this information by writing to the points of contact indicated above or by attending applicable public scoping meetings. A mailing list will also be established so that pertinent data may be distributed to interested agencies, interest groups and individuals.

Public Scoping Meeting

The scoping meeting is scheduled for October 29, 1998, at 7:00 PM, City Council Chambers, City Hall, De La Guerra Plaza, Santa Barbara, California.

[[Page 54682]]

Dated: October 2, 1998.
John P. Carroll,
Colonel, Corps of Engineers, District Engineer.
[FR Doc. 98-27373 Filed 10-9-98; 8:45 am]
BILLING CODE 3710-KF-M

Public Scoping Meeting will be held October 29, 1998. Time and location of the Public Scoping Meeting also will be announced by means of a letter, public announcements, and news releases. Public participation will be especially important in the environmental analysis by providing assistance in defining the scope of analysis in the EIS/EIR; identifying significant environmental issues and impact analysis in the EIS/EIR; and providing useful information such as published and unpublished data, personal knowledge of relevant issues, and recommending mitigation measures associated with the proposed action. Those wishing to provide information or data relevant to the environmental or social impacts that should be included or considered in the environmental analysis can furnish this information by writing to the points of contact indicated above or by attending applicable public scoping meetings. A mailing list will also be established so that pertinent data may be distributed to interested agencies, interest groups and individuals.

6. **Public Scoping Meeting:** The scoping meeting is scheduled for October 29, 1998, at 7:00 PM, City Council Chambers, City Hall, De la Guerra Plaza, Santa Barbara, California.

Date 98/002

Signature

John P. Carroll
Colonel, Corps of Engineers
District Engineer

BILLING CODE: No. 3710-KF

DEPARTMENT OF DEFENSE

DEPARTMENT OF THE ARMY

CORPS OF ENGINEERS

Intent to Prepare a Draft Environmental Impact Statement/ Environmental Impact Report (DEIS/EIR) for the Lower Mission Creek, Santa Barbara, California.

AGENCY: U.S. Army Corps of Engineers, DoD.

ACTION: Notice of Intent

SUMMARY: The Mission Creek drainage area is located in and adjoining the City of Santa Barbara, California, about 100 miles northwest of the City of Los Angeles. The drainage area, comprising about 11.5-square miles, is a narrow coastal area and extends from the Santa Ynez Mountains on the north to the Pacific Ocean on the south. Mission Creek rises at about 4,000 feet elevation and flows about eight miles through the City of Santa Barbara to empty into the Pacific Ocean. The primary study area for the proposed project extends from Canon Perdido, downstream to the Pacific Ocean. The length of the project construction area is about 1.2 miles.

Enclosure

ADDRESSES: Commander, U.S. Army Corps of Engineers, Los Angeles District, Environmental Design Section, CESPL-PD-RL, P.O. Box 532711, Los Angeles, CA 90053-2325

FOR FURTHER INFORMATION CONTACT: Ms. Joy Jaiswal, Technical Manager, phone (213) 452-3871, or Mr. Edward Demesa, Study Manager, phone (213) 452-3796. The City of Santa Barbara Point of Contact is Ms. Janice Hubbell, AICP, Project Planner, phone (805) 564-5470.

SUPPLEMENTARY INFORMATION:

1. Authorization:

The Lower Mission Creek, Flood Control Project is authorized under Section 209 of the Flood Control Act of 1962 (Public Law 87-874, 87th Congress, 2nd session), approved October 23, 1962. The US Army Corps of Engineers (USACOE), in cooperation with the County Flood Control District and the City of Santa Barbara, will be conducting a feasibility study for solutions to the flooding problem along Lower Mission Creek. The study will identify, describe, and evaluate alternative plans and fully develop the recommended plan to be submitted to Congress for project authorization.

2. Background: The USACOE has been involved in this project since 1964. Lower Mission Creek, especially downstream from Carrillo Street, poses a serious flood threat to the City. In this area, a mix of residential, commercial, and public properties are subject to major damages during floods. The USACOE and the City of Santa Barbara are planning to prepare a Draft EIS/EIR to address and evaluate impacts to the environmental

resources due to the improvement/construction along Lower Mission Creek. In addition, alternative solutions and recommendations to the flood and associated problems will be included with consideration to economic, environmental and social needs of the area. In the past, public workshops have been conducted to identify the public's concerns regarding the proposed project construction. Public concerns were about aesthetics of the creek, impacts to the biological resources and recreation.

The tidewater goby (*Eucyclogobius newberryi*), Federally listed as threatened, has been identified in the lower-most portion of Mission Creek. Steelhead (*Oncorhyncus mykiss*,Federally endangered) of undetermined genetic origin also use the downstream reach of Lower Mission Creek as a channel for migration. Although sporadic in their ascent of Mission Creek from the ocean, their irregular presence in this watershed has recently been verified.

3. **Proposed Action:** Construction of a flood control channel at Lower Mission Creek, Santa Barbara, California.

4. **Alternatives:**

a. *No Action:* No improvement of the Creek.

b. *Proposed Alternative Plans:* The proposed plan would provide up to 3400 cfs (20-year flood protection) and consists of creek improvements from Canon Perdido Street to the Pacific Ocean. The improvements would include stabilized banks at a 2:1 (V:H) slope above U.S. Highway 101, while below U.S. Highway 101,

vertical walls would be the dominant bank treatment with a sloped bank applied whenever practicable. A variety of sloped bank stabilization methods will be considered, which includes stabilization of sideslopes using gabions, engineered earth, and/or stepped concrete walls. In order to increase the conveyance capacity of the creek, the alternatives would incorporate a new covered channel cutting off the "oxbow" area from just above U.S. Highway 101 and rejoining the creek near the Chapala Street bridge. The improved channel would generally follow the existing channel alignment except at the "oxbow" bypass. The "oxbow" would be left in place functioning as a low flow channel. The majority of the 12 bridges within the project reach except for Bath Street bridge and State Street bridge would require some modification or reconstruction.

5. Scoping Process:

a. Potential impacts associated with the proposed action will be evaluated. Resource categories that will be analyzed are: land use, physical environment, geology, biology, air quality, water quality, groundwater, recreational usage, aesthetics (visual quality), noise, cultural resources, transportation/ circulation, hazardous waste, socioeconomic (including)housing and safety.

b. Participation of affected Federal, State, and local resource agencies, Native American groups and concerned interest groups/individuals is encouraged in the scoping process. A

In the Superior Court of California
IN AND FOR THE COUNTY OF SANTA BARBARA

18319

In the Matter of: CITY OF SANTA BARBARA 61476-2255

NOTICE OF PREPARATION OF A
DRAFT ENVIRONMENTAL IMPACT STMT.

PROOF OF PUBLICATION
(2015.5 C.C.P)

STATE OF CALIFORNIA}
ss}.
County of Santa Barbara}

I am a citizen of the United States and a resident of the County aforesaid; I am over the age of eighteen years, and not a party to or interested in the above entitled matter. I am the principal clerk of the printer of the Santa Barbara News-Press, a newspaper of general circulation, printed and published daily in the City of Santa Barbara, County of Santa Barbara, and which newspaper has been adjudged a newspaper of general circulation by the Superior Court of the County of Santa Barbara, State of California, under date of June 9, 1952,10838 Case Number 47171; that the notice herein mentioned was set in type not smaller than nonpareil and was preceded by words printed in black-face type not smaller than nonpareil, describing in general terms the purport and character of the notice intended to be given; that the notice, of which the annexed is a printed copy, has been published in each regular issue of said Santa Barbara News-Press on the following dates, to-wit:

OCTOBER 13,

All in the year 1998 I hereby certify (or declare) under penalty of perjury that that foregoing is true and correct.

Executed on this 16TH day of OCT. 1998 at Santa Barbara , CA.

Regina A Radriguez
Signature

RECEIVED
NOV 11 1998
CITY OF SANTA BARBARA
PLANNING DIVISION

City of Barbara

To:- All Responsible an Trustee Agencies and Inter ested Parties

Subject: Notice of Preparatio of a Draft Environmental Impact Statement/ Environment Impact Report

Lead Agencies:

CEQA: City of Santa Barbara
Planning Division
Post Office Box 1990
Santa Barbara, CA 93102-1990
(805) 564-5470

NEPA: Commander
U.S. Army Corps of Engineers,
Los Angeles District
Environment Design Section,
CESPL-PD-RL
P.O. Box 532711
Lost Angeles, CA 90053-2325

Contact: Janice M. Hubbell, Project Planner
Contacts: Ms. Joy Jaiswal, Technical Manager
Mr. Ed Demesa, Study Manager

THE CITY OF SANTA BARBARA will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the project identified below. The U. S. Army Corps of Engineers will be the Lead Agency for the Environmental Impact Statement (EIS). The EIR and EIS will be prepared as a joint document. We need to know the vies of you or your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Responsible and Trustee agencies will need to use the EIR/EIS prepared by our when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study [] is [X] is not attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

A Scoping Meeting will be held on October 29, 1998 before the Planning Commission and the U.S. Army Corps of Engineers. The meeting will begin at 7:00 PM and will be held in the City Council, City Hall, De la Guerra Plaza, Santa Barbara.

Please send your response to JANICE HUBBELL AND/OR JOY JAISWALL OR ED DEMESA at the addresses shown above. We will need the name for a contact person in your agency.

Project Title: LOWER MISSION CREEK FLOOD CONTROL PROJECT

Project Location: MISSION CREEK, BETWEEN CANON PERDIDO STREET AND PACIFIC OCEAN, CITY OF SANTA BARBARA, COUNTY OF SANTA BARBARA.

Project Description: Proposal to channelize Mission Creek from Carrillo Street to the Pacific Ocean in order to provide flood protection. See attached Initial Study and Notice of Intent for more detail.

Date: September 28, 1998
Project No.: ENV98-0330
APN: Several
ZONE: C-2, R-3, R-4, P-R, HRC-1, HRC-2 and S-D-3

Reference: California Administrative Code, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

Oct13/98--18319

Notice of Preparation

To: **All Responsible and Trustee Agencies and Interested Parties**

Subject: Notice of Preparation of a Joint Environmental Impact Statement/Environmental Impact Report

Lead Agencies:

CEQA: City of Santa Barbara
Planning Division
Post Office Box 1990
Santa Barbara, CA 93102

NEPA: Commander
U.S. Army Corps of Engineers, Los Angeles District
Environmental Design Section, CESPL-PD-RL
P.O. Box 532711
Los Angeles, CA 900 53-2325

Contact: Janice M. Hubbell., Project Planner

Joy Jaiswal, Technical Manager or Ed Demesa, Study Manager

The City of Santa Barbara will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the project identified below. The U.S. Army Corps of Engineers will be the Lead Agency for the Environmental Impact Statement (EIS). The EIR and EIS will be prepared as a joint document. We need to know the views of you or your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Responsible and Trustee agencies will need to use the EIR/EIS prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study ([ ] is [X] is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but **not later than 30 days** after receipt of this notice.

A Scoping Meeting will be held on October 29, 1998 before the Planning Commission and the U.S. Army Corps of Engineers. The meeting will begin at 7:00 PM and will be held in the City Council Chambers, City Hall, De la Guerra Plaza, Santa Barbara.

Please send your response to Janice Hubbell and/or Joy Jaiswal or Ed Demesa at the addresses shown above. We will need the name for a contact person in your agency.

Project Title: Lower Mission Creek Flood Control Project

Project Location: City of Santa Barbara, County of Santa Barbara

Project Description: Proposal to channelize Mission Creek from Carrillo Street to the Pacific Ocean in order to provide flood protection. See attachment for more detail.

Date September 28, 1998 Signature: _____

Project No.: ENV98-0330 Title: Project Planner

APN: Several Telephone: (805) 564-5470

ZONE: C-2, R-3, R-4, P-R, HRC-1, HRC-2 and S-D-3

Reference: California Administrative Code, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

[J:/jh/mis/miscreek.nop]

REVISED:3-20-91

CITY OF SANTA BARBARA
COMMUNITY DEVELOPMENT DEPARTMENT
PLANNING DIVISION

INITIAL STUDY/ENVIRONMENTAL CHECKLIST ENV98-0330

LOWER MISSION CREEK FLOOD CONTROL PROJECT

This Initial Study has been completed for the project described below because the project is subject to review under the California Environmental Quality Act (CEQA) and was determined not to be exempt from the requirement for the preparation of an environmental document. The information, analysis and conclusions contained in this Initial Study are the basis for deciding whether a Negative Declaration (ND) is to be prepared or if preparation of an Environmental Impact Report (EIR) is required to further analyze impacts. Additionally, if preparation of an EIR is required, the Initial Study is used to focus the EIR on the effects determined to be potentially significant.

PROJECT ADDRESS/LOCATION (See Vicinity Map, Exhibit 1)

The project area includes Mission Creek and properties immediately adjacent to the creek from just downstream of Carrillo Street to the ocean. See Project Description, Vicinity Map and Site Plan for more detail.

ENVIRONMENTAL REVIEW REQUIREMENTS

The Santa Barbara County Flood Control District is the Local Sponsor according to the Corps. However, the project is entirely within Santa Barbara City limits. The District and the City have agreed that the City will act as the Lead Agency for purposes of CEQA because of the project location. This is allowed under CEQA Guidelines Section 15051(d). The District will participate in the environmental review process through administrative review of the environmental document and participation in consultant selection.

The City and the Corps have worked out an agreement to prepare a joint Environmental Impact Statement/Environmental Impact Report (EIS/R). This is consistent with CEQA Guidelines Section 15222, which encourages the preparation of joint documents. The Corps and City Planning staff will complete the majority of the work. If it is determined to be necessary, subconsultants will be hired to assist with certain areas of technical analysis. Concurrently with the EIS/R, the Corps will prepare the Feasibility Study. This Study continues the work done in the Reconnaissance Flood Control Study. It further defines and tests the project. The information developed in the Study is used to determine impacts in the EIS/R.

PROJECT DESCRIPTION (See Site Plan, Exhibit 2)

The United States Army Corps of Engineers (Corps) has been authorized by Congress to channelize a portion of Mission Creek in order to provide flood protection. This project would be completed in cooperation with the Santa Barbara County Flood Control District (the Local Sponsor) and the City of Santa Barbara (the Lead Agency). Mission Creek, which flows through the City of Santa Barbara, poses a serious flood threat to the City, especially along lower reaches of the stream, downstream from Carrillo Street. In this area, a mix of residential, commercial and public properties is subject to major damage during floods. More background on historic flooding is contained in the Corps' Reconnaissance Flood Control Study (Exhibit 3).

The plan would consist of creek improvements from Canon Perdido Street to the Pacific Ocean. The improvements would include stabilized banks at a 2:1 (V:H) slope above Highway 101, while below Highway 101, vertical walls would be the dominant bank treatment with a sloped bank applied whenever practicable. A variety of sloped bank stabilization methods would be considered, including stabilization of sideslopes using gabions, engineered earth, and stepped concrete walls. In order to increase the conveyance capacity of the creek, high flows would be diverted to a covered segment, which would bypass an existing bend in the channel where it crosses U.S. Highway 101.. The improved channel would generally follow the existing channel alignment except at the oxbow bypass. The oxbow would be left in place functioning as a low flow channel. The channel may vary from 50 to 75 feet in width and may vary from five to 15 feet deep. It would include a collection system and would join with an existing concrete channel that now terminates near Canon Perdido Street.

In order to achieve the required channel width, it would be necessary to demolish and replace several roadway bridges over the creek. There are twelve bridges within the project reach. Bridges at several locations would be replaced or modified during construction of the flood control project. These replacements and/or modifications will be further defined in the Corps' Feasibility Report, prepared concurrently with the EIS/R.

Areas of low quality oak woodland habitat and estuarine habitat would be lost. The mitigations identified in the Corps' 1986 Environmental Impact Statement (EIS) for the previous Lower Mission Creek Flood Control Project included off-site construction of 1.6 acres of high quality riparian woodland and 1.0 acre of soft bottom estuarine habitat at Lake Los Carneros and Atascadero Creek, respectively. However, the new Environmental Impact Statement/Environmental Impact Report (EIS/R) will look at possible onsite mitigation instead.

Permanent flood control maintenance and access easements would be purchased and temporary construction and access easements will be obtained prior to the start of construction for the entire area of construction. It will also be necessary to provide one or more construction staging and storage areas.

Construction of the channel would result in impacts on existing improvements on some properties yet to be determined. The Corps' Feasibility Study will include a final alignment determination. The final alignment will resolve which properties would be affected by the project. The impacts upon these properties will be discussed in the EIS/R.

Construction is expected to begin in either summer 2000 or summer 2001 and would last one year, with work done in accordance with all applicable environmental regulations and timeframes.

APPLICANT/PROPERTY OWNER NAME AND ADDRESS

Colonel Robert E. Davis
Environmental Design Section, CESPL-PD-RL
Los Angeles District
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, CA 90053-2325

Mr. Pat Kelly, City Engineer / Assistant Public Works Director
City of Santa Barbara Public Works Department
630 Garden St.
P.O. Box 1990
Santa Barbara, CA 93102

Mr. Steven Wagner
Santa Barbara County Flood Control District
123 E. Anapamu St.
Santa Barbara, CA 93101

ENVIRONMENTAL SETTING

The project site extends from Canon Perdido Street to the ocean. The riparian habitat along this stretch of Mission Creek is heavily disturbed by adjacent development and previous flood control efforts. Some areas of this reach are less disturbed than others. There is also a small estuary at the mouth of the creek. Existing vegetation and habitat are discussed in more detail under Biological Resources.

In some areas, the natural creek bank remains. In other areas, gabions have been installed or the walls have been covered with gunite. Mission Creek is channelized in a trapezoidal channel between Micheltorena Street and Canon Perdido Street. There are also isolated sections of concrete wall along the creek. Near the mouth, bulkheads have been installed.

From Carrillo Street south to the freeway, structures along the creek are primarily residential, including both single and multiple family development. South of the freeway, most of the uses are commercial, ranging from small retail and restaurant operations to hotels and motels. In addition, the Union Pacific Railroad Station is near the edge of the project area and the railroad tracks cross Mission Creek just downstream from the freeway.

PLANS AND POLICY DISCUSSION

There are several General Plan and Local Coastal Plan goals and policies that relate to Mission Creek. As applied to the proposed project, some of these policies are contradictory. There are visual and open space policies that call for the maintenance and enhancement of creekside areas as well as biological resource policies that call for protection of creek habitats and the return of disturbed creeks to their natural state. In other areas, drainage, flood control and safety policies require floodplain management and hazard reduction programs that may result in the need for channelization. The Conservation Element makes it clear that all of these policies must be considered together when weighing proposed flood control projects. A full discussion of plans and policies will be contained in the EIS/R.

MITIGATION MONITORING AND REPORTING PROGRAM (MMRP)

A Mitigation Monitoring and Reporting Program will be prepared as part of the EIS/R for the subject project in compliance with Public Resources Code §21081.6

ENVIRONMENTAL CHECKLIST

The following checklist contains questions concerning potential changes to the environment that may result if this project is implemented. If no impact would occur, **NO** should be checked. If the project might result in an impact, check **YES** indicating the potential level of significance as follows:

Known Significant: Known significant environmental impacts. Further review needed to determine if there are feasible mitigation measures and/or alternatives to reduce the impact.

Potentially Significant: Unknown, potentially significant impacts which need further review to determine significance level.
Significant, avoidable: Potentially significant impacts which can be mitigated to less than significant levels.

Less Than Significant: Impacts which are not considered significant.

1. AESTHETICS. Could the project:	NO	YES Level of Significance
a) Affect a public scenic vista or designated scenic highway or highway/roadway eligible for designation as a scenic highway?		Potentially significant
b) Have a demonstrable negative aesthetic effect in that it is inconsistent with Architectural Board of Review or Historic Landmarks Guidelines or guidelines/criteria adopted as part of the Local Coastal Program?		Potentially significant
c) Create light or glare?	✓	

Discussion:

1.a-b. Existing development and flood control (both legal and impromptu) along the creek banks have altered the riparian habitat of the creek. Because of this development, there is a greatly reduced vegetative understory. There are also a variety of trees, both native and exotic, located in the area that may be affected by the project.

Based on community standards, it is likely that channelization will be seen as having a significant visual impact that is possibly unavoidable. A number of trees will be lost as a result of the grading necessary for the project. Some of these trees are important for aesthetic reasons in that they provide visual relief in an urban setting. Some may qualify as skyline trees that provide neighborhood landmarks. Loss of such trees could affect the City's skyline. The project will require fencing along the banks to prevent access to the creek. Depending on the type of fencing used, obstruction of views beyond Mission Creek could occur. The design of the channel in the Waterfront Area is critical because so many people, both residents and tourists, view it. This area has existing visual and aesthetic problems due to trash and water stagnation. Regular maintenance will help reduce some of these problems. To eliminate the smell, aeration or other solutions will be needed.

It will be necessary to outline, in some detail, potential mitigation measures in the new document. Input from the Architectural Board of Review (ABR) and the Historic Landmarks Commission (HLC) will be useful in completing this section. The previous project, which proposed full concrete channelization, was reviewed at a joint meeting of the ABR and HLC on June 15, 1992. Their comments included the following: 1) Request that alternatives that do not involve full concrete channelization be studied in more detail; 2) There was substantial concern expressed about the appearance of the creek mouth, both in terms of removing the stagnant water that stands between the mouth and Mason Street and the design of the grouted stone and concrete-walled opening; 3) Concern about the impact of the project on the Moreton Bay Fig Tree; 4) Suggest working with landscape architects to smooth and soften impacts, including berming, significant use of trees and bushes with a variety of colors, textures and seasonality; 5) Concern that neighborhoods are split in a clear and defined way by project; and 6) Look at individual

properties for individual enhancements. The first concern regarding consideration of other alternatives that do not involve full channelization has been answered by the revised project. However, the other concerns remain to a lesser or greater degree.

1.c The project will not result in a change to light or glare.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

2. AIR QUALITY. Could the project:	NO	YES Level of Significance
a) Violate any air quality standard or contribute to an existing or projected air quality violation?		Potentially significant, short-term
b) Expose sensitive receptors to pollutants?	✓	
c) Create objectionable odors?	✓	
Is the project consistent with the County of Santa Barbara Air Quality Attainment Plan? Yes		

Discussion:

2.a-b. During construction, there will be substantial air emissions from construction equipment and vehicles, as well as dust generated by grading. Given the area's non-compliance with carbon monoxide (CO) and particulate standards, this will likely result in a short-term impact. In addition, construction-related traffic will contribute to existing ROC and NOx problems at various intersections, particularly at Carrillo/ U.S. 101. The EIR/S will include the necessary analysis of air quality impacts and a construction management plan that minimizes the potential impacts.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

3. BIOLOGICAL RESOURCES. Could the project result in impacts to:	NO	YES Level of Significance
a) Endangered, threatened or rare species or their habitats (including but not limited to plants, fish, insects, animals, and birds)?		Potentially Significant
b) Locally designated historic, Landmark or specimen trees?		Potentially Significant
c) Natural communities (e.g. oak woodland, coastal habitat, etc.).		Potentially Significant
d) Wetland habitat (e.g. marsh, riparian, and vernal pool)?		Potentially Significant
e) Wildlife dispersal or migration corridors?		Potentially Significant

Discussion:

Data included in the original EIS for this project were gathered from a variety of sources including U.S. Fish and Wildlife Service (USFWS) fieldwork which resulted in a 1986 report, a 1983 study performed by Chambers Consultants and Planners (now Chambers Group), a 1984 report by Scott Cooper and Nina Hemphill and historic data from the Santa Barbara Museum of Natural History, the Santa Barbara Botanic Gardens and the University of California at Santa Barbara Vertebrate Zoology Museum. This data is further updated by studies performed in 1994 by John Storrer for the Mission Creek Consensus Group. Most of the studies assessed the entire drainage for Mission and Rattlesnake Creeks. In some areas, small boulders, broken rocks and cobbles line the creek. There are also two areas where the streambed is interrupted by concrete bottomed channel: 1) a small section of a concrete channel primarily above Carrillo Street that extends downstream into the project area close to Castillo Street; and 2) approximately 0.1 mile of rectangular concrete bottomed/stone-walled channel from the Union Pacific Railroad tracks to Chapala Street. There has also been a variety of modifications to the stream banks including grouted stone, sacked concrete, pipe and wire revetments, gabions and, near the ocean, bulkhead structures.

This lower reach of Mission Creek is typically dry from early summer to the beginning of the next wet season. Natural flow regimes are often altered by releases through Mission Tunnel from Gibraltar Reservoir in order to flush debris from the tunnel and for groundwater recharge. These releases typically soak into the ground above the Santa Barbara Mission.

3.a., c., d. As recently as 1993, there were no State or Federally-listed Endangered or Threatened Species in Mission Creek. However, in 1994, the Tidewater goby (*Eucyclogobius newberryi*) was Federally listed as an Endangered species. In 1998, the Steelhead (*Salmo gairdnerii*) was also Federally listed as an Endangered species. The Tidewater goby has been confirmed to exist in the estuary of Mission Creek and other creeks in the area. The Steelhead historically used Mission Creek for spawning and growth of young fish. It appears that Steelhead may have returned to Mission Creek in the last few years. There is some indication that Steelhead may be in the creek between Carrillo and Mission Streets and in Rattlesnake Creek, a tributary of Mission Creek. A candidate for listing, the California Red-legged frog (*Rana*

aurora draytonii), may also exist in Mission Creek in the project area. One candidate threatened plant species, Hoffman's sanicle (*Sanicula hoffmanii*) exists within the creek drainage; however, it is outside the project area, above the Botanic Gardens and in Rattlesnake Canyon. In addition, the State and Federally listed Endangered California brown pelican (*Pelecanus occidentalis californicus*) has been observed roosting and loafing in small numbers in the mouth of Mission Creek.

Ongoing development and flood control along the creek banks have altered the riparian habitat of the creek. Because of this development, there is a greatly reduced vegetative understory. Because of the urbanization in this area, it supports a lower number of species and individuals than is the case in the rest of the Mission Creek drainage. However, this portion of lower Mission Creek still operates as a wildlife corridor. There are also a variety of trees, both native and exotic, located in the area, which may be affected by the project.

There are remnants of the original estuarine plant community at the mouth of Mission Creek. Isolated patches of native plants exist along the creek banks, although the majority of the vegetation is composed of non-native, weedy species. A small tidal lagoon is present north of Cabrillo Boulevard and serves as a temporary resting and feeding site for migratory waterfowl, as well as providing habitat for several species of small fish. Finally, the creek meanders across the sand to the ocean just east of Stearns Wharf.

The project would involve the loss of existing habitat and loss of trees that are part of urban vegetation. It will be necessary to replace lost Riparian Woodland habitat. There is a potential for such replacement between Gutierrez Street and U.S. 101 where Caltrans owns land that could be appropriately graded and vegetated. In addition, the existing channel south of the railroad between Chapala and Montecito Streets will be maintained and used as a channel during low flow periods. This will preserve the remnant freshwater marsh in this area.

The project will retain an earth bottom which will allow Steelhead to move upstream for spawning. There are, however, existing obstacles on Mission Creek, especially the Caltrans channel between Canon Perdido and Micheltorena Streets. The project may allow the Tidewater goby to use the lower channel area above Cabrillo Boulevard for foraging, resting and breeding.

Questions have been raised about the appearance and smell of the estuary between Mason Street and the beach. The smell is caused by the loss of oxygen resulting from stagnation of the water. The possible options for reducing appearance and smell problems include:

- Breaching the sand bar created at the mouth of the creek when it is not flowing. This allows ocean water to flow into and cleanse the estuary area. However, this also results in a rapid change in the salinity which could kill the entire population of the Tidewater goby in Mission Creek. Because it is an endangered species, this approach may be precluded.

- Aerating the water which would reduce oxygen loss and resulting stagnation. Apparently, this is a fairly expensive approach.

- Releasing enough water from Gibraltar Reservoir for water to reach the estuary during the summer months. This would dilute the stagnant brackish water with oxygen-rich fresh water.

These options and others will require further study, in part because of their potential impact on the Tidewater goby.

Consideration of future operation and maintenance of the project is an important part of the environmental review process. In order to maintain the channel so that it can contain the design flow, it will be necessary to restrict the growth of vegetation in the channel. Maintenance may have an effect on the wildlife living in the channel. A description of how maintenance will be carried out needs to be included in the project description (in the Feasibility Study) so that its impacts can be considered in the EIS/R.

3.b. The Moreton Bay Fig Tree at the intersection of Chapala and Montecito Streets was designated as a City Landmark in 1982. In addition, in 1997, it was added to the California Big Tree Register. It is recognized as sharing the distinction as the largest tree of its type in California (the other tree is in Balboa Park in San Diego). Additional discussion of the tree's importance is included under Cultural Resources. The proposed underground culvert would pass near this tree and it is important that the culvert be designed to avoid its roots and dripline. As noted under Aesthetics, other trees, particularly between Mason and Yanonali Streets, and in several locations north of the freeway, may have importance as skyline trees.

3.e. The channelization and required safety fencing along the channel could result in significant barriers to the movement and activities of resident wildlife.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

4. CULTURAL RESOURCES. Could the project:		NO	YES Level of Significance
a)	Disturb archaeological resources?		Potentially Significant
b)	Affect a historic structure or site designated or eligible for designation as a National, State or City landmark?		Potentially Significant
c)	Have the potential to cause a physical change which would affect ethnic cultural values or restrict religious uses in the project area?	✓	

Discussion:

4.a. CA-SBa-27, a Chumash archaeological site, is located along the west side of Mission Creek between State Street and Mason Street (generally). It most likely consists of secondary scatter in this area. This site does not appear to be the same site ("Twin Palms") as described in the 1986 EIS (p.24), based on the described location. Additional study may be required.

4.b. A Structure of Merit at 15 W. Mason Street may be altered or demolished. It was constructed in 1924-1925 and was originally the garage for the Hotel Californian. The Historic Landmarks Commission designated it as a Structure of Merit in 1988. The Resolution designating the property noted that it is one of

the last remaining hotel garages in Santa Barbara and that it also has architectural merit. In addition, it is likely that the Potter Hotel Foot Bridge near Chapala Street would need to be removed to accommodate the outlet for the culvert. Also, some of the bridges that will be removed may qualify as historic structures. Finally, the Moreton Bay Fig Tree at the intersection of Montecito and Chapala Streets is a designated City Landmark. As noted above, it is also listed on the California Big Tree Register as a Co-Champion with another Moreton Bay Fig Tree in Balboa Park. The City Urban Historian has also indicated that she believes that it is eligible for listing on the California and National Registers of Historic Places.

Additional work on the historic and/or architectural value of other buildings to be removed will be assessed in the EIS/R.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

5. GEOPHYSICAL. Could the project result in or expose people to:	NO	YES Level of Significance
a) Seismicity: fault rupture?	✓	
b) Seismicity: ground shaking or liquefaction?		Significant, avoidable
c) Seismicity: seiche or tsunami?	✓	
d) Landslides or mudslides?	✓	
e) Subsidence of the land?	✓	
f) Expansive soils?	✓	
g) Excessive grading or permanent changes in the topography?	✓	

Discussion:

5.a., b. According to the Master Environmental Assessment (MEA), the Mesa Fault emerges onto land west of Stearns Wharf and trends northwesterly toward U.S. 101. From there, the fault generally parallels U.S. 101 through the project area. It appears that none of the project area is actually in the fault zone. However, the MEA does indicate that, south of the Union Pacific Railroad (UPRR), the project is in an area of low to moderate damage to 1 to 3 story structures, with potential for moderate damage to large structures. This same area is also subject to high liquefaction potential. The remainder of the project area north of the UPRR is subject to low damage level to 1 to 3 story structures and moderate damage to large structures. It is also subject to questionable to conditional liquefaction potential. Prior to construction, it will be necessary to complete geologic and soils reports to mitigate potential impacts to acceptable levels as outlined in Mitigation Measure GEO-1 below.

5.c. The entire project is within the tsunami run-up area. However, construction of this project should somewhat improve drainage problems resulting from a tsunami.

5.d.-g.. There is no chance that this project would result in landslides or mud slides. In addition, subsidence of land would not occur nor are there expansive soils. There is a potential for changes in topography and ground surface relief features; however, these would not be considered to be significant.

Mitigation Measure(s):

GEO-1 Prior to completion of final design, soils and geologic reports will be required in order to assess potential impacts which may result from liquefaction and seismic events, and to address/recommend any required special design features to minimize potential impacts. The report must be submitted prior to receiving any discretionary approvals, and all recommendations and mitigation measures contained in the report must be incorporated into the project's plans.

Residual Impact: With the incorporation of the above mitigation measure, the project's geophysical impacts will be less than significant.

6. HAZARDS. Could the project involve:		NO	YES Level of Significance
a)	A risk of accidental explosion or release of hazardous substances (including, but not limited to: oil, pesticides, chemicals or radiation)?		Potentially Significant
b)	The creation of any health hazard or potential health hazards?	✓	
c)	Exposure of people to existing sources of potential health hazards?	✓	
d)	Increased fire hazard in areas with flammable brush, grass, or trees?	✓	

Discussion:

6.a. During the construction process, it is possible that construction materials will be accidentally released into the streambed, resulting in impacts on humans and on nearby habitat. The contractor will be required to prepare and implement a Storm Water Pollution Prevention Plan in order to minimize such impacts. The contents of such a plan will be outlined in the EIS/R.

6.b. Presently, there is almost unlimited access to Mission Creek from streets crossing the creek and from the rear of properties that back onto the creek. This has led to safety issues during heavy flows, including the potential for people to be swept down the creek.

A concern was raised during the scoping process for the previous project in 1992 about potential public

safety issues resulting from channelization. Water would flow more swiftly, thus potentially resulting in more danger to people who fall in during heavy flows. In addition, there was concern that people could fall into the vertical sided channel when the creek is low or dry and be injured. To some degree, this concern remains with the new project. Although the walls will not be vertical in much of the project area (except south of the freeway), they will still be steep-sided. However, it appears possible to mitigate these impacts through access control and the provision of rescue points.

6.c. Concern had been expressed that, with the loss of groundwater recharge in lower Mission Creek resulting from full channelization, existing contamination in shallow groundwater aquifers could spread. However, with the maintenance of a soft bottom, this will no longer be an issue.

6.d. This project will not result in increased fire hazard.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

7. NOISE. Could the project result in:	NO	YES Level of Significance
a) Increases in existing noise levels?		Potentially Significant, short-term
b) Exposure of people to severe noise levels?		Potentially Significant, short-term

Discussion:

7.a., b. During construction, there will be substantial noise generated by construction equipment and vehicles. Because much of the affected area is residentially zoned with a maximum ambient noise level allowance of 60 dB(a) CNEL, it is likely that the project will result in short-term significant unavoidable noise impacts. While the City does not consider such short-term impacts to be significant, the EIS/R will include the necessary analysis of noise impacts and a construction management plan that minimizes the potential impacts.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

8. POPULATION AND HOUSING. Could the project:		NO	YES Level of Significance
a)	Induce substantial growth in an area either directly or indirectly (e.g. through projects in an undeveloped area or extension of major infrastructure)?	✓	
b)	Displace existing housing, especially affordable housing?		Potentially Significant

Discussion:

8.a. Because this area is already heavily developed, it is not expected that completion of this flood control project will induce substantial growth.

8.b. Some housing units may be removed as a result of the project. The residents will be relocated as part of the project. The number of units affected will be determined in the Feasibility Study, which will be completed concurrent with the Draft EIS/R. Previous flood control projects considered involved the loss of no more than three units. However, the presently proposed project channel is generally wider than previously proposed projects, resulting in a potential to impact greater numbers of residential units. If the current project has an effect similar to previous projects, it will not be considered to result in a significant environmental impact on housing supply.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

9. PUBLIC SERVICES. Could the project have an effect upon, or result in a need for new or altered services in any of the following areas:	NO	YES Level of Significance
a) Fire protection?	✓	
b) Police protection?	✓	
c) Schools?	✓	
d) Maintenance of public facilities, including roads?	✓	
e) Other governmental services?	✓	
f) Electrical power or natural gas?	✓	
g) Water treatment or distribution facilities?	✓	
h) Sewer or septic tanks?	✓	
i) Water distribution/demand?	✓	
j) Solid waste disposal?		Potentially Significant

Discussion:

9.a.-c. This project is not expected to result in the need for increased police or fire protection or for increased school capacity.

9.d Existing streets in the project area will likely be damaged during construction. However, standard construction contracts require repair to at least equivalent pre-project conditions by the contractor. In addition, several bridges will be modified or replaced as a result of the proposed project.

9.e.-i. As a result of the channelization, it will be necessary to relocate existing utilities, primarily water, storm, gas and sewer lines and various telephone, cable television and electrical cables. No significant impacts are expected to occur. In addition, it is expected that drainage in the area will improve, especially during heavy storms.

9.j. Because the new channel will be generally wider than the existing channel, it will be necessary to dispose of an as yet unknown amount of graded material. Because the Tajiguas Landfill is close to capacity, it will be necessary to develop a plan for appropriate disposal of such material.

Mitigation Measure(s): To be determined in the EIS/R (solid waste only).
Residual Impact: To be determined in the EIS/R (solid waste only).

10. RECREATION. Could the project:		NO	YES Level of Significance
a)	Increase the demand for neighborhood or regional parks or other recreational facilities?	✓	
b)	Affect existing parks or other public recreational facilities?	✓	

Discussion:

10.a. Presently, Mission Creek provides some recreational opportunities, especially above U.S. 101. Children play in the creek. Some people walk their dogs or hike in the creek. There are no parks or recreational facilities in the West Downtown area so the creek provides informal recreation opportunities. East Beach and the Moreton Bay Fig Tree Park provide recreational opportunities south of U.S. 101. In addition, Railroad Park, just south of the railroad, at the depot, will be completed in the near future.

The existing recreational opportunities will be impaired. Access to the creek will be controlled. However, it is possible that new opportunities for "pocket parks" may be created from left over parcels purchased for right-of-way purposes. Provision of additional park spaces may also help to mitigate visual impacts.

10.b. The proposed project would have minimal impacts on existing park facilities, primarily East Beach. While portions of the area around the mouth of Mission Creek would be blocked off during construction, this would be a short-term concern that would not result in significant recreation impacts. However, at the request of area residents and the Corps, a discussion of recreation impacts will be included in the EIS/R.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

11. TRANSPORTATION/CIRCULATION. Could the project result in:	NO	YES Level of Significance
a) Increased vehicle trips?		Potentially Significant
b) Hazards to safety from design features (e.g. sharp curves, inadequate sight distance or dangerous intersections)?	✓	
c) Inadequate emergency access or access to nearby uses?	✓	
d) Insufficient parking capacity on-site or off-site?	✓	
e) Hazards or barriers for pedestrians or bicyclists?		Potentially Significant

Discussion:

11.a-e. During construction, street blockages will occur and considerable construction traffic will be generated which may result in short-term significant unavoidable impacts in the construction area and on travel routes to and from the area. The EIS/R will analyze intersections and circulation patterns.

Analysis should focus on impacts to the Carrillo Corridor, the Haley/Gutierrez one-way couplet, the Waterfront and to the Haley/De la Vina, Haley/Castillo and Castillo/101 intersections. In addition, it should focus on impacts on parking, pedestrians and bicyclists.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

12. WATER ENVIRONMENT. Could the project result in:	NO	YES Level of Significance
a) Changes in absorption rates, drainage patterns, or the rate and amount of surface runoff?	✓	
b) Exposure of people or property to water related hazards such as flooding?	✓	
c) Discharge into surface waters?	✓	
d) Change in the quantity, quality, direction or rate of flow of ground waters?	✓	
e) Increased storm water drainage?	✓	

Discussion:

12.a., b., c., e. This channelization will likely affect absorption rates and drainage patterns in the area; however, these impacts are not expected to be significant. In fact, they may be beneficial in improving drainage in the affected area. In addition, the project will improve the flow of floodwaters and reduce the exposure of people and property to flooding.

The channelization of Mission Creek may result in changes in deposition or erosion of beach sands. It is expected that less settlement would occur in the creek bed, with more material being carried to the ocean due to the increase in velocity and energy resulting from channelization.

This project is not expected to result in either an increase in discharge into surface waters or increased storm water drainage, but will instead further channelize existing surface and storm waters.

12.d. There has been some disagreement on the effect of the project on City groundwater supplies and on the quality of the groundwater. The Water Commission, at its April 13, 1992 meeting recommended staff to: 1) include peer review and testing of recharge potential and an independent party review of existing data in the EIR on the Mission Creek lining project; 2) evaluate in EIR the Army Corps of Engineer's lining proposal and the Urban Creeks Council's alternative; and 3) have the Army Corps assess full costs of recharge loss. Their request was based on information presented that indicated that loss of recharge might result in saltwater intrusion and other impacts. This discussion was based on the previously proposed fully channelized project and would no longer apply. In any case, the "Peer Review of Flood Flow and Groundwater Issues" report, prepared by David Dawdy, concluded that the impacts of paving the channel bottom on water supply, salt water intrusion and water quality would not be significant.

Mitigation Measure(s): To be determined in the EIS/R.
Residual Impact: To be determined in the EIS/R.

MANDATORY FINDINGS OF SIGNIFICANCE.		YES	NO
a)	Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildfire population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	✓	
b)	Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?		✓
c)	Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	✓	
d)	Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	✓	

INITIAL STUDY CONCLUSION

On the basis of this initial evaluation it has been determined that:

The proposed project MAY have a significant effect on the environment, and further study in an ENVIRONMENTAL IMPACT REPORT is required.

Case Planner/Initial Study Preparer: Janice M. Hubbell

Environmental Analyst: Debra A. Andalaro

Date: Oct. 8, 1998

Exhibits

1. Vicinity Map
2. Site Plan and Channel Cross-Section
3. Reconnaissance Flood Control Study, without Technical Documentation (distributed separately, available at Planning Office)
4. Mission Creek Flood Control Project Alternatives Analysis (distributed separately, available at Planning Office)
5. Mission Creek Consensus Group Recommendations, Council Agenda Report, September 23, 1994 (distributed separately, available at Planning Office)

LIST OF SOURCES USED IN PREPARATION OF THIS INITIAL STUDY

The following sources used in the preparation of this Initial Study are located at the Community Development Department, Planning Division, 630 Garden Street, Santa Barbara and are available for review upon request.

California Environmental Quality Act (CEQA) & CEQA Guidelines

Dawdy, David R. Peer Review of Flood Flow and Groundwater Issues for the Lower Mission Creek Channelization EIR/SEIS. Report to the City of Santa Barbara. Undated (1993).

General Plan Circulation Element

General Plan Conservation Element

1995 Housing Element

General Plan Land Use Element

General Plan Noise Element w/appendices

General Plan Map

General Plan Seismic Safety/Safety Element

Geology Assessment for the City of Santa Barbara

Institute of Traffic Engineers Parking Generation Manual

Institute of Traffic Engineers Trip Generation Manual

Kennedy/Jenks Consultants. Final Report, Mission Creek Flood Control Project Alternatives Analysis. Prepared for the City of Santa Barbara. August 1994.

Local Coastal Plan (Main & Airport)

Master Environmental Assessment

Parking Design Standards

Philbrick, Ralph. Final Program Environmental Impact Report for Santa Barbara County Flood Control Routine Maintenance Activities. Prepared for the Santa Barbara County Resource Management Department (90-EIR-7). March 27, 1991.

Santa Barbara Municipal Code & City Charter

Special District Map

Storrer, John, 1994a. Biological Resources Fatal Flaw Investigation of Potential Debris Basin Sites - Mission Creek Flood Control Alternatives Analysis. Letter report to Dr. Rudolf E. Ohlemutz, Kennedy/Jenks Consultants, Ventura, California. April 11, 1994.

_____, 1994b. Biological Resources Fatal Flaw Analysis - Mission Creek Flood Control Alternatives Analysis. Letter report To Dr. Rudolf E. Ohlemutz, Kennedy/Jenks Consultants, Ventura, California. June 21, 1994.

Swift, Camm C., Jack L. Nelson, Carolyn Maslow and Theodore Stein; Biology and Distribution of the Tidewater Goby, *Eucyclogobius newberryi* (Pisces: Gobiidae) of California; Contributions in Science, No. 404, pp. 1-19, 14 March 1989; Natural History Museum of Los Angeles.

Uniform Building Code as adopted by City

United States Army Corps of Engineers, Los Angeles District. Feasibility Report and Environmental Impact Statement, Lower Mission Creek Interim Santa Barbara County Streams, California. August 1986.

_____. Santa Barbara Streams – Lower Mission Creek, Reconnaissance Flood Control Study, November 1995

United States Fish and Wildlife Service, 1994. Brewer, Donna C., Cathy Brown and Thomas Davidson, principal authors. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Tidewater Goby; Federal Register, Vol. 59, No. 24, pp. 5494- 5498, February 4, 1994.

Zoning Ordinance & Zoning Map

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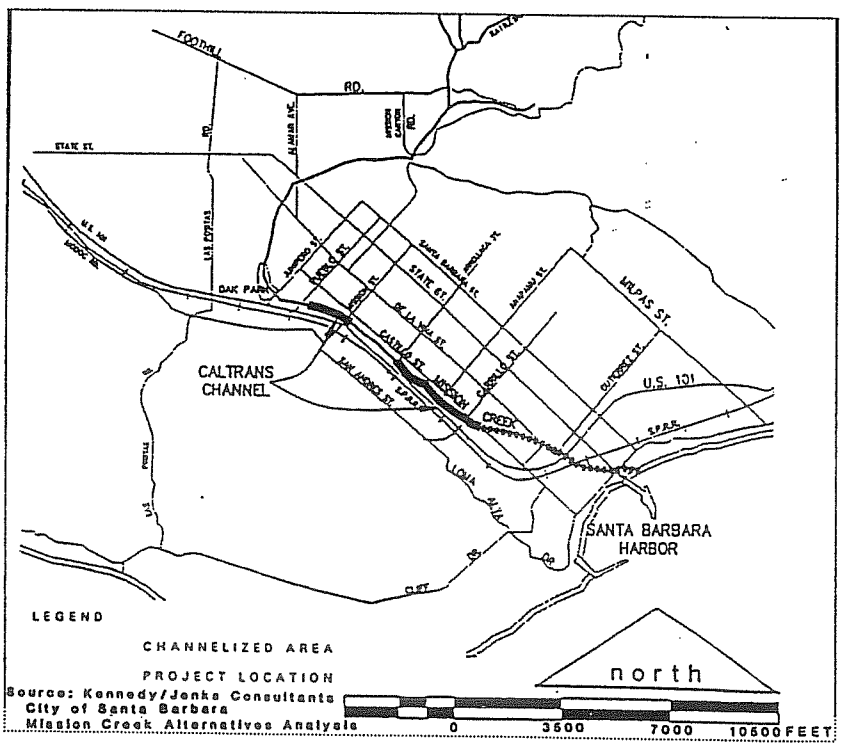
ENVIRONMENTAL SCOPING MEETING

AND NOTICE OF PREPARATION FOR

US Army Corps of Engineers
Los Angeles District

YOUR OPPORTUNITY TO IDENTIFY ISSUES FOR ENVIRONMENTAL EVALUATION OF THE

LOWER MISSION CREEK FLOOD CONTROL PROJECT



- ✓ Thursday Evening October 29, 1998
- ✓ 7:00 PM
- ✓ Santa Barbara City Hall, De la Guerra Plaza

The U.S. Army Corps of Engineers and the City of Santa Barbara are holding a public environmental scoping meeting on October 29, 1998 to seek public comments on the potential environmental impacts that should be studied on the Lower Mission Creek Flood Control Project authorized by Congress.

The proposed plan would consist of creek improvements from Canon Perdido Street to the Pacific Ocean. The improvements would include stabilized banks at a 2:1 (V:H) slope above Highway 101, while below Highway 101, vertical walls would be the dominant bank treatment with a sloped bank applied whenever practicable. A variety of sloped bank stabilization methods would be considered, including stabilization of sideslopes using gabions, engineered earth, and stepped concrete walls. In order to increase the conveyance capacity of the creek, high flows would be diverted to a covered segment, which would bypass an existing bend in the channel where it crosses U.S. Highway 101. The improved channel would generally follow the existing channel alignment except at the oxbow bypass. The oxbow would be left in place functioning as a low flow channel. The channel may range from 50 to 75 feet in width and may be from five to 15 feet deep. It would include a collection system and would join with an existing concrete channel that now terminates near Canon Perdido Street. If you have questions about the project, please contact Jan Hubbell, Project Planner, at 564-5470. You may submit written comments no later than November 13, 1998 to: ATTN: Jan Hubbell, Planning Division, P.O. box 1990, Santa Barbara, CA 93102

LOWER MISSION CREEK FLOOD CONTROL PROJECT

EIS/EIR SCOPING COMMENTS

1. Richard A. Stromme, Railroad Advocates, October 10, 1998

Concerned that the City is trying to kill the Landmark Moreton Bay Fig Tree by constructing the culvert from Gutierrez Street to Yanonali Street.

Says cleaning out culvert would be difficult and costly.

Says culvert would be clogged with debris and would create flooding.

The culvert would go through the roots of the tree, resulting in its death.

Loss of view of creek due to culvert.

People and criminals living and hiding in culvert.

New facilities at station would be destroyed.

The existing sandstone walls at Mission Creek would be destroyed.

Railroad operations would be disrupted by construction of project.

The existing channel at the station is clogged by trees and shrubs, leading to flooding. Who's responsible for maintenance?

The steep banks will not result in any linear park that is needed in overcrowded area. Construct sloping banks for a usable park.

2. *Edward B. Cella, Santa Barbara City Historic Landmarks Commissioner, October 15, 1998

The project area is an old established residential neighborhood, characterized by buildings from the turn of the century to the late 1930s. Designated and potential historic and cultural resources must be identified early.

No professional survey has been done of much of the area, especially north of the freeway and the existing survey below the freeway is more than five years old. All of the affected area must be resurveyed.

Section 106 requires full environmental disclosure of impacts to historic resources. Mitigation must apply to both the interior and exterior of resources and photographic HABS/HAER documentation is not sufficient mitigation.

As much green space and rustic character that exists should be maintained. Use formally designed bridges, natural boulders and sycamores.

3. *Barry Kaufman, Family Service Agency of Santa Barbara, October 16, 1998

   Have bank erosion problems along their property (123 W. Gutierrez St.). Bank has eroded so much that three very large ficus trees on bank top are now in danger of falling into creek. Also, parking lot is starting to crumble and fall into creek. Contributing factors include the already protected opposite bank which deflects the water current back to their unprotected bank and the design of the Gutierrez St. bridge directs the water current to the unprotected bank. This bank needs protection.

4. William T. Hogarth, Regional Administrator/Korie Johnson, National Marine Fisheries Service, October 28, 1998

   The project is in the Southern California Evolutionarily Significant Unit for the Steelhead. Concerned about project impacts on the Steelhead.

   EIS/R should include description of project and associated construction activities; list of biological resources and federally listed species in project area; a description of the adverse impacts on the steelhead; and mitigation measures to minimize effects.

5. The Kelly Family, October 30, 1998

   Against concreting any part of Mission Creek.

   Loss of wildlife habitat unacceptable.

   Provide wetland restoration.

6. Samuel and Connie Marquez, November 2, 1998

   No more vertical concrete walls.

   A natural vegetated slope is preferable.

7. Don Warren, November 3, 1998

   The carrying capacity of the creek itself is not the problem; the problem is the capacity of the bridges. He's concerned this will not be taken into account.

8. Lessie Nixon, President, League of Women Voters of Santa Barbara, November 3, 1998

   Supported Consensus Agreement and state that it should serve as the baseline for project.

   Support efforts to improve water quality, including creating open, natural channels and eliminating concrete.

Support Committee for Santa Barbara report on ocean pollution resolution and, as a result, will have to do even better than the Consensus agreement.

9. JoAnn Lewis, November 5, 1998

Supportive of Committee for Santa Barbara approach; against concrete sides.

10. Josiah F. Jenkins, Jedlicka's Saddlery, November 5, 1998

Major concerns are:

- Bridge capacity – house at 625 Bath lost to 1995 floods; flooding at business at 2605 De la Vina; ongoing Amtrak depot problems.
- Not enough stream capacity
- Losses to property owners and public from flood damage.

Solutions:

- Keep existing concrete channel above Carrillo St.
- Look at diverting excess flows to Arroyo Burro Creek
- Add a second channel between Gutierrez Street and the ocean to handle high flows
- Concrete line below Carrillo Street with steep banks and smooth bottom
- Look at increasing stream capacity from upper De la Vina to ocean
- Look at solutions even if not environmentally friendly

11. Brian Trautwein, Environmental Defense Center, November 8, 1998

Project description is inconsistent with and more environmentally damaging than Consensus Group recommendation. It included sloped, stabilized & vegetated banks below U.S. 101. Present project was a secondary alternative. Recognize need for vertical walls at some bridges only.

Vertical walls, when necessary, must be rough sandstone with planting pockets, ledges, overhangs, pockets and other irregularities for habitat and visual impact mitigation.

Consensus Group project based on 3210 cfs, now recognized as 18-year storm. However, the group agreed to 3210 cfs, not necessarily 25-year storm protection. Larger project reduces feasibility of using sloped banks. The Consensus Group project, as described, should be the preferred project. The presently preferred project should just be an alternative to maintain good faith with the group and the community.

Impact discussion needs to include:

- Wider channel will reduce area available for riparian buffer and passive recreation along creek.
- Wider channel will make project more expensive.

- Smaller buffer will be less conducive to riparian revegetation, less effective at filtering pollutants from adjacent urban environment and less effective at buffering habitat from night lighting and other human disturbances.
- Need to look at setbacks for future development on creek.
- Analyze enlarging the buffer to reduce habitat and flood impacts.
- Wider channel could increase solar radiation of water resulting in water quality and decrease the ability to shade creek bottom resulting in thermal, odor and water pollution.
- Reduction in flooding could have impacts on riparian habitat.
- Impacts on biological resources including steelhead and other endangered species need to be analyzed.
- Mitigation by habitat restoration should be analyzed, including removal or modification of existing concrete bottoms and sides in other areas of the creek and modification of debris basins to remove barriers to steelhead migration.
- Stream geomorphology changes will impact hydrology and affect formation of pools and riffles. Also, look at sedimentation, particularly near mouth of creek.
- Cumulative impacts of existing, planned and proposed development near creek, including floodplain development and retaining walls (i.e., Harborview Inn).
- Water quality impacts.
- Aesthetic impacts.
- Channel safety with vertical walls.
- Maintenance impacts. Future maintenance regime must be described.
- Policy consistency analysis required.

Includes potential funding sources.

12. Catherine McCammon, Citizens Planning Association of Santa Barbara County, November 10, 1998

Support the results of the Consensus Agreement.

Restoration of Mission Creek, in terms of flood control, wetland and riparian restoration, water quality improvements, visual/aesthetics and socio-economics, all very important.

Alternatives need to include comprehensive approaches including not just flood control, but wetland and riparian restoration. Should also include discussion of improving and modifying debris basins and the removal of existing concrete bottoms. Each alternative should be clearly described, including differences with Consensus Group recommendations.

Impacts analyzed should include:

- Water quality, not just creek and estuary, but impacts on ocean as well. Include pollution and contamination.
- Policy inconsistencies, including the Vision, to be spelled out. Example: vertical concrete walls below U.S. 101 will have negative aesthetic impact & are contrary to City and Vision policies.

- Loss of vegetation, number & type of trees, loss of riparian habitat & effects on species in Mission creek.
- Visual resources impacts
- Safety and aesthetics impacts resulting from vertical walls, including fencing. Also, impacts of fencing on wildlife.
- Impacts of a wider channel. Does this result in smaller buffers?
- Impacts on existing neighborhoods, including loss of moderate and low cost housing and historic structures.
- Impact on Structure of Merit and archaeological resources.
- Impact on livability and character of neighborhood.

13. Keith Zandona, Santa Barbara Chapter Chair, Surfrider Foundation, November 11, 1998

Cemented concrete walls and bottoms of project will destroy the health of the riparian habitat.

The aesthetics will be completely destroyed.

Water pollution will be worse.

EIS/R needs to assess the loss of buildings, visual and aesthetics and water quality.

14. Forest B. Wilde, November 12, 1998

This Mission Creek section is already almost all paved vertical walls.

This Mission Creek section is dirty and smelly.

Completely paved section of Creek near Micheltorena is more attractive than the disputed section.

Two solutions: the Army Corps way (inexpensive & quick); or buy up land and make it attractive, similar to San Luis Obispo.

Something needs to be done soon.

15. Erik and Alex Funke, November 12, 1998

Their section of creek along Kimberley Avenue has a shady overstory (including skyline trees), a healthy vegetative understory, diverse habitat (including birds) and healthy groundwater recharge. A concrete ditch will result in its loss.

The concrete channel will result in significant visual/aesthetic impacts, no matter how dressed up.

Consider the goals and policies of the City General Plan.

Foolish to spend a lot of money so every 25 years merchants and householders won't have minor flooding impacts. This is governmental waste.

16. A Frequent Tourist, undated (postmark, November 12, 1998)

Fix creek by starting at ocean and working up the creek. Clean up creek instead of maintaining parks.

17. Doug and Elizabeth Dennison (w/magazine articles), November 13, 1998

Owns property on Mission Creek (416 W. Islay) that was severely eroded during 1/95 floods.

Referenced several issues of "Erosion control," the Official Journal of the International Erosion Control Association, published in Santa Barbara. Several articles show the use of environmental friendly erosion and flood control projects, including:

- Use of native vegetation and "soft armor" systems in several projects, including removal of concrete channels.
- Combination wetland restoration, stream bank stabilization and flood control projects across country.
- How one city did flood control and renewal using 100% local funds.

The main point is that there are many options to doing standard concrete walls.

Interested in no more concrete walls. Any solution must be predominantly natural and include the restoration of wetlands and fish habitat. Also, support removal of existing concrete.

City should hire appropriate experts to design a custom solution.

18. Sharyn Main, South Coast Watershed Alliance, November 13, 1998

Project should incorporate wetlands enhancement, creation and restoration to mitigate impacts improve watershed water filtration capabilities and enhance visual and biological resources. A thorough analysis of these issues should be in EIS/R.

Supports elimination of concrete lining in creeks and the planting of native plants along banks.

Very concerned about use of concrete vertical walls south of U.S. 101.

Project should include an increased riparian buffer from top of bank outwards.

Should investigate potential funding sources to augment project's environmental enhancements, including additional creek and wetland restoration, purchase of property to allow sloped banks and larger setbacks for existing and future development.

19. *Wanda Michalenko, Urban Creeks Council, November 14, 1998

Existing concrete channelization contributes to water pollution on Mission Creek and should be removed.

Supports proposal by the Committee for Santa Barbara to recreate wetlands linking Mission Creek and Laguna Channel. This alternative should be included in the EIS/EIR.

20. Antonio R. Romasanta, November 17, 1998

Concerned about existing water quality worsened by sand closure at mouth. Natural flushing by tides is required. Need to increase channel capacity to fix, while keeping lagoon as narrow as possible.

60 foot width is unacceptable. Support width of 40 to 45 feet.

Quotes 1994 USFWS report that there are no sensitive fresh water species known in the area. Questions whether the Brown pelican should still be considered as endangered and protected as part of project.

Reducing threat of flooding and increasing health and safety of residents and visitors most important goal, while being attractive.

21. *Maurie McGuire, Planning Commissioner, November 18, 1998

She asks for the following areas of emphasis in the EIS/EIR:

- Natural values – Recognition that flooding and flow are not the only issues relative to Mission Creek; natural and habitat values are important and must be considered.
- Mission Creek Consensus Group Recommendation – Include analysis of their primary recommendation.
- Enhancement Alternative – Include environmentally superior alternative that includes a more natural restoration and enhancement of creek (see PC minutes).
- Existing Policy – Analysis of project for consistency with existing policies including Conservation Element, LCP, Vision and others.
- Cost:Benefit Analysis – Must be thorough and long term and include factors for maintenance, prevention of sedimentation and pollution, and natural and recreational values. Also, recognition of creek as part of an ecosystem that can mitigate East Beach bacteria counts through creating natural filters. Should also include the need for regular monitoring and cleanup of creeks including stringent enforcement of violations and the establishment of buffer zones.
- Other considerations include creek bank erosion and lack of vegetation that limits filtering ability; illegal or irrational uses close to creeks resulting in animals, yard waste, garbage; illegal dumping and debris that clog flows.

22. *Richard Frickmann, November 18, 1998

The project should be comprehensive and include flood control, water quality enhancement, habitat reclamation and recreation and education.

Seek additional funding from sources such as: Federal Clean Water Act, Calif. Dept. of Water Resources, CREF, Land Trust, Parks and Recreation, Transportation & educational sources.

Any overflow channel should be above ground and be used as foot and bike path in the dry season.

Remove existing concrete channel and fences along public right of way.

Provide exit points from creek bottom for safety and creek clean up purposes.

Provide natural or artificial pools (some with overhangs) for habitat.

Where feasible, have street runoff flow through vegetative biofilter before entering the creek.

Restore the historic wetland at the mouths of Mission Creek and Laguna Channel east of Stearns Wharf.

Provide footpaths and educational signs along creeks and over the wetlands.

Have the Chamber of Commerce advertise our creeks and wetlands as an attraction of Santa Barbara.

Encourage creekside businesses to face the creek, thereby giving them a vested interest in its health.

23. *Laura Rasmussen, President, Allied Neighborhoods Association, November 19, 1998

Heavy rains and potential overflow problems occur no more than 10 days a year. The greater problem is nearly continual, year-round discharge of polluted creek water.

Allied is strongly committed to the reduction of polluted water discharge into the ocean waters off Santa Barbara.

Modify the proposal as follows:

- Combine flood control and pollution reduction with wetland purification in a joint estuary of Mission Creek & Laguna Channel.
- Support Committee for Santa Barbara report.

24. *Eddie Harris, November 19, 1998

City has not taken serious steps to purchase buildings and properties in the flood plain. In fact, more development is being encouraged in these areas.

Due to a lack of awareness and regard for natural creek and watershed systems, water quality has significantly declined. Healthy beaches are important to the residents of Santa Barbara.

There are limits to how much development and tourism Santa Barbara can support. One indicator of reaching those limits is the recurring flooding. Others are basic health and safety and quality of life indicators.

Recommend changes to the project to include non point source pollution and to include the Laguna watershed and Sycamore Creek. The City should immediately take measures, with or without the Corps to restore creeks and watersheds.

Solutions:

- Design and adopt methodologies for: sloped or terraced natural, vegetated banks w/native plantings & shaded, rock lined creek bottoms; establish buffer zones alongside creeks; removal of fill from selected sites for use as restored wetlands and storm water receptors; reconfigure of storm drains and infrastructure to return low flow runoff from the City hardscape to restored wetlands; link up creeks & storm runoff to the ocean across vegetative biofilters that purify naturally & provide for safe release of high flow waters.
- Remove all concrete from Mission Creek.
- Acquire properties adjacent to creek and in flood plain across Waterfront to implement the above.
- As new permit applications come up, enlarge wetland presence through mitigation.

The natural creek system should be restored and the Waterfront should be returned to wetlands, through purchase of both developed and undeveloped properties and restoration.

25. *Steve Dunn, S.B. Trappers, November 20, 1998

Submitted on behalf of the Santa Barbara area commercial fishermen.

Corps must take into account the World Ocean Conference's adoption of an integrated management policy for recreating and protecting all of our ocean dependent environmental elements.

Assembly Bill 1241 (1998) requires projects in the State to enhance and protect critical fish habitat.

Proposal outlines a series of channels (or pipes where necessary) to direct first flush runoff into a biofilter watershed remediation project from Mission Creek to Andree Clark Bird Refuge.

System would permit control of the connecting water flow. System would accommodate injection of tertiary treated water for flushing of point and non-point source pollution.

Maps are included to show both historic wetland and a conceptual linkage system.

26. *Kim Kimbell, Co-Chairman, Committee for Santa Barbara, November 20, 1998

Committee for Santa Barbara submitted "Waterfront Wetlands/Lower Mission Creek Flood Management Project" proposal. Suggest that proposal be considered either as mitigation proposal or an extension to the project. Address re-creation of historic Laguna wetland for water quality treatment and structural channel design modifications. Proposal includes the following points:

Re-creation of a Waterfront Wetland:

- Problems of flood control and impaired water quality must be addressed in a single project because they are interrelated.
- EIS/EIR must address water quality because creek alteration may cause increased interception of degraded ground water with subsequent discharge to the Harbor.
- Community identity, economy and public health dependent upon our coastal environment.
- Visioning process called for more open space in Waterfront. Possible restoration of Laguna Channel and acquisition of additional property in the flood plain would protect viewsheds, reduce congestion and protect the small town quality of the Waterfront Area.
- 1995 Reconnaissance Flood Control Study has an emphasis on natural habitat and wetlands restoration and acknowledges that creek system must be technically and aesthetically effective in this tourist city setting.
- Request that the Corps and City retain an independent engineering firm to assist in developing a "bio-engineered channel/wetlands treatment alternative" prior to preparation of the EIS/EIR. An example of this approach was used by the Corps & Napa County to establish a historic natural flood plain restoration/flood control project and also for the Wildcat Creek project in San Pablo and El Sobrante in East San Francisco Bay.
- To restore wetlands as mitigation to habitat loss caused by project, consider use of the remains of a large wetland area adjacent to Mission Creek, including the outlet of the historic Laguna Channel and its link to the mouth of Mission Creek.
- Restoration of these wetlands would involve diversion of first flush storm water and floodwater to the Laguna Channel system.
- Areas of the old Laguna Channel system could be restored by being uncovered, linked by channels and planted with vegetation to purify, beautify and assist in flood control.
- To provide fresh water outside the rainy season and avoid creating a tidal marsh (to protect the Goby), use treated wastewater piped from El Estero Wastewater Plant. This would maintain a water source for in-stream aquatic life and purify pollutants entering the creek bed.
- Undeveloped public and private property would probably need to be used. Some acreage would probably need to be acquired or donated.

- New natural wetland habitat would provide place for creek walkways, cafes and restaurants, educational opportunities and tourist attraction.
- Commercial fishermen would support use of a portion of land set aside for their future use because restoration of wetlands would assist in the improvement of commercial fisheries.

Structural Channel Design Alternatives:

- Corps should purchase selected properties and relocate users to allow for a widened natural channel with sloping, earthen banks. The community would be willing to finance additional costs separately to make sure project meets cost-benefit ratio.
- Channel vegetation should include woody riparian species, not just grasses.
- Existing cultural values of native sandstone walls must be retained and where new vertical walls are proposed in the vicinity of such walls, they must look like the historic walls.
- Vertical walls of smooth concrete and cyclone fencing are not acceptable.
- Where vertical walls are necessary, they should look like sandstone block.
- Where near vertical walls are required, use planted live concrete crib walls, planted and terraced walls, planted concrete bin-walls (evergreen walls) or planted gabions (least preferred).
- On properties where there is no development in the floodplain, new development must be discouraged or must mitigate to augment and protect existing wetland and creek resources.
- New construction in wetland or creek locations should follow a design standard set by the San Luis Obispo and Ashland models.
- Creekfront properties should not be treated as back alleys or sewers. Buildings should be oriented to creeks. While a larger issue than the project, this should be addressed in the EIS/EIR.

Alternative Project - The following alternative should be considered in the EIS/EIR:

- A small wetland (4 – 6 acres) should be re-created around lower Laguna Channel. Initially, this could include an area behind the Chase Palm Park expansion, the present and future fisherman's area and the cement yard to the west (?) of the carousel. Expansion could occur through purchase of UPRR property by the City and possible donation of property by Mr. Wright near his hotel project.
- Wetland would be supplemented with water during dry periods with use of secondary or tertiary treated water from El Estero Wastewater Treatment Plant.
- During flood flows, a diversion from Mission Creek to the re-created wetland in the Laguna Channel would bring a portion of the flow to be cleansed and then to exit at the tidegate to the ocean.
- Mission Creek would also be supplemented during dry periods with use of secondary or tertiary treated water from El Estero Wastewater Treatment Plant which would occur near U.S. 101 and be diverted to the wetland before release at Laguna Channel.
- Tidal flooding should be restored during summer months, possibly by converting tide gate into a "tide/slide gate" that would be fully open in summer with tidal inflow

regulated by the slide gate. System would have tidal action in the summer and freshwater action in the winter, a process known as "shocking." This would allow the system to operate similarly to many historic Southern California tidal estuaries.

27. *Mark Capelli, California Coastal Commission, November 20, 1998

Potential significant impacts on Coastal Zone resources:

- Wetland habitats
- Water Resources, including hydrologic function from both biological and water supply perspective and changes to sediment transport resulting from concrete walls
- Effect on endangered species including tidewater goby, southern Steelhead, Snowy plover and Least tern

Consistency with Plans and Policies, particularly Coastal Act and LCP, with particular issues of vertical concrete walls in estuary.

Consider alternatives included in Spectra Report of 1987 (89?)

Use "Commission's Statewide Interpretive Guidelines for Wetlands and Other Wet Environmentally Sensitive Habitats (1981)

Must consider effect of portion of project outside the Coastal Zone on coastal resources.

Suggests that watershed dynamics are more like those of an alluvial fan than of a typical river channel and we should design and plan accordingly.

28. *Antero Rivasplata, Chief, State Clearinghouse, November 23, 1998

No comments received from any State agencies during the Scoping Period.

29. Steve Hoegerman, December 7, 1998

Say "no" to the Army Corps. Do not pave Mission Creek.

LOWER MISSION CREEK FLOOD CONTROL PROJECT

EIS/EIR SCOPING COMMENTS

1. Richard A. Stromme, Railroad Advocates, October 10, 1998
2. Edward B. Cella, Santa Barbara City Historic Landmarks Commissioner, October 15, 1998
3. Barry Kaufman, Family Service Agency of Santa Barbara, October 16, 1998
4. William T. Hogarth, Regional Administrator/Korie Johnson, National Marine Fisheries Service, October 28, 1998
5. The Kelly Family, October 30, 1998
6. Samuel and Connie Marquez, November 2, 1998
7. Don Warren, November 3, 1998
8. Lessie Nixon, President, League of Women Voters of Santa Barbara, November 3, 1998
9. JoAnn Lewis, November 5, 1998
10. Josiah F. Jenkins, Jedlicka's Saddlery, November 5, 1998
11. Brian Trautwein, Environmental Defense Center, November 8, 1998
12. Catherine McCammon, Citizens Planning Association of Santa Barbara County, November 10, 1998
13. Keith Zandona, Santa Barbara Chapter Chair, Surfrider Foundation, November 11, 1998
14. Forest B. Wilde, November 12, 1998
15. Erik and Alex Funke, November 12, 1998
16. A Frequent Tourist, undated (postmark, November 12, 1998)
17. Doug and Elizabeth Dennison (w/magazine articles), November 13, 1998
18. Sharyn Main, South Coast Watershed Alliance, November 13, 1998
19. Wanda Michalenko, Urban Creeks Council, November 14, 1998
20. Antonio R. Romasanta, November 17, 1998
21. Maurie McGuire, Planning Commissioner, November 18, 1998
22. Richard Frickmann, November 18, 1998
23. Laura Rasmussen, President, Allied Neighborhoods Association, November 19, 1998
24. Eddie Harris, November 19, 1998
25. Steve Dunn, S.B. Trappers, November 20, 1998
26. Kim Kimbell, Co-Chairman, Committee for Santa Barbara, November 20, 1998
27. Mark Capelli, California Coastal Commission, November 20, 1998
28. Antero Rivasplata, Chief, State Clearinghouse, November 23, 1998
29. Steve Hoegerman, December 7, 1998

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APPENDIX - I -1

CORRESPONDENCE RELATED TO PUBLIC HEARING

LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

December 15, 1999

REPLY TO
ATTENTION OF

Office of the Chief
Environmental Resources Branch

Mr. Richard E. Sanderson, Director
Office of Federal Activities, NEPA Compliance Division
Environmental Protection Agency (EPA)
EIS Filing Section (Attn: Ms. Pearl Young)
Ariel Rios Building (South Oval Lobby)
Mail Code 2252-A, Room 7241
1200 Pennsylvania Avenue, NW
Washington, D.C. 200044

Dear Mr. Sanderson:

Enclosed for filing are five copies of the Draft Feasibility Report and Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for Lower Mission Creek Flood Control Project, Santa Barbara, Santa Barbara County, California, Clearing House Publication # is 98101061. Please publish the Notice of Availability (NOA) in the Federal Register. Distribution of copies of the Draft EIS/EIR has been completed. Should you have any questions regarding the project, please contact Ms. Joy Jaiswal, Environmental Coordinator, at (213) 452-3871 or Dr. John Moeur, Project Biologist at (213) 452-3874. Mr. Ed Demesa, Study Manager can be reached at (213) 452-3796.

Sincerely,

Robert E. Koplin, P.E
Chief, Planning Division

Enclosure

[Federal Register: December 23, 1999 (Volume 64, Number 246)]
[**Notices**]
[Page 72078-72079]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr23de99-54]

Pearl Young (202) 564-7167

ENVIRONMENTAL PROTECTION AGENCY

[ER-FRL-6249-3]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564-7167 OR www.epa.gov/oeca/ofa. Weekly receipt of Environmental Impact Statements Filed December 13, 1999 Through December 17, 1999 Pursuant to 40 CFR 1506.9.

EIS No. 990476, Draft EIS, AFS, AZ, Williams Ski Area Expansion on Bill Williams Mountain, Implementation, Special-Use-Permit, Kaibab National Forest, Williams Ranger District, Coconino County, AZ, Due: February 22, 2000, Contact: Teri Cleeland (520) 635-5620.
EIS No. 990477, Final EIS, AFS, UT, Snowbird Ski and Summer Resort Master Development Plan, Implementation, Special-Use-Permit and COE Section 404 Permit, Salt Lake and Lake Counties, Salt Lake City, UT, Due: January 21, 2000, Contact: Rob Cruz (801) 733-2685.
EIS No. 990478, Draft EIS, COE, AZ, Tres Rios Feasibility Study Project, Ecosystem Restoration, Located at the Salt, Gila and Agua Fria Rivers, City of Phoenix, Maricopa County, AZ, Due: February 07, 2000, Contact: Alex Watt (213) 452-3860.
EIS No. 990479, Draft EIS, COE, CA, Lower Mission Creek Flood Control Project, Proposed Plan for Flood Control, City of **Santa Barbara**, **Santa Barbara** County, CA, Due: February 07, 2000, Contact: Joy Jaiswal (213) 452-3871.
EIS No. 990480, Final EIS, FHW, CO, Southeast Corridor Multi-Modal Project, To Improve Travel between Central and Southeast Corridors, Light Rail Transit (LRT), Colorado Metropolitan Area, Denver, CO, Due: January 21, 2000, Contact: Vince Barone (303) 969-6730.
EIS No. 990481, Final EIS, NRC, SC, Generic EIS--License Renewal of Nuclear Plants for the Oconee Nuclear Station, Units 1, 2 and 3, Implementation, Oconee County, SC, Due: January 21, 2000, Contact: James H. Wilson (301) 415-1108.
EIS No. 990482, Final EIS, NPS, DC, The White House and President's Park Comprehensive Design Plan, Implementation of a Framework for Future Management, Washington, DC, Due: January 21, 2000, Contact: James I. McDaniel (202) 619-6344.
EIS No. 990483, Draft EIS, NRS, Programmatic EIS--Emergency Watershed Protection Program, Improvements and Expansion, To Preserve Life and Property Threatened by Disaster-Caused Erosion and Flooding, US 50 States and Territories except Coastal Area, Due: February 15, 2000, Contact: Donald Gohmert (202) 720-3534.
EIS No. 990484, Final EIS, USA, NJ, Military Ocean Terminal (MOTBY), Disposal and Reuse, Implementation, in the City of Bayonne, Bergen, Essex and Hudson Counties, NJ, Due: January 21, 2000, Contact: Theresa Persick-Arnold (703) 697-0216.

[[Page 72079]]

EIS No. 990485, Final EIS, USN, CA, Marine Corp Air Station (MCAS) Tustin Disposal and Reuse Plan, Cities of Tustin and Irvine, Orange County, CA, Due: January 21, 2000, Contact: Dana Ogdon (714) 573-3116.

EIS No. 990486, Draft EIS, FHW, OH, Lancaster Bypass (FAI-US 22/US 33-9.59/9.95) Construction, Funding, Greenfield, Hocking, Berne and Pleasant Townships, Fairfield County, OH, Due: February 11, 2000, Contact: Leonard E. Brown (614) 280-6869.
EIS No. 990487, Final EIS, FTA, MD, Metrorail Extension--Addison Road Station to the Largo Town Center, Transportation Improvements, Prince George's County, MD, Due: January 31, 2000, Contact: Gail McFadden-Roberts (215) 656-7100.

Amended **Notices**

EIS No. 990461, Draft EIS, COE, NY, Fire Island Inlet to Montauk Point, Implementation, Reach 1--Fire Island Inlet to Moriches Inlet Interim Storm Damage Protection Project, Long Island, NY, Due: January 31, 2000, Contact: Pete Weppler (212) 264-0195. Published (FR 12-17-99) Correction to Comment Period from 2-7-2000 to 1-31-2000.
EIS No. 990462, Draft EIS, FHW, TN, Interstate 40 (I-40) Transportation Improvements from I-75 to Cherry Street in Knoxville, Funding, NPDES and COE Section 404 Permits, Knox County, TN, Due: January 31, 2000, Contact: Charles Boyd (615) 781-5770. Published (FR 12-17-99) Correction to Comment Period from 2-7-2000 to 1-31-2000.
EIS No. 990463, Draft EIS, BOP, SC, South Carolina--Federal Correctional Institution, Construct and Operate, Possible Sites: Andrew, Bennettsville, Oliver and Salters, SC, Due: January 31, 2000, Contact: David J. Dorworth (202) 514-6470. Published (FR 12-17-99) Correction to Comment Period from 2-7-2000 to 1-31-2000.
EIS No. 990465, Final EIS, COE, AR, Grand Prairie Area Demonstration Project, Implementation, Water Conservation, Groundwater Management and Irrigation Water Supply, Prairie, Arkansas, Monroe and Lonoke Counties, AR, Due: January 17, 2000, Contact: Edward P. Lambert (901) 544-0707. Published (FR 12-17-99) Correction to Comment Period from 1-24-2000 to 1-31-2000.
EIS No. 990467, Final EIS, FHW, IN, US 231 Transportation Project, New Construction from CR-200 N to CR-1150 S, Funding, Right-of-Way Permit and COE Section 404 Permit, Spencer and Dubois Counties, IN, Due: January 17, 2000, Contact: John R. Baxter (317) 226-7445. Published (FR 12-17-99) Correction to Comment Period from 1-24-2000 to 1-17-2000.
EIS No. 990468, Regulatory Final EIS, OSM, Valid Existing Rights--Proposed Revisions to the Permanent Program Regulations Implementing Section 522(E) of the Surface Mining Control and Reclamation Act of 1977 and Proposed Rulemaking Clarifying the Applicability of Section 522(E) to Subsidence from Underground Mining, Due: January 17, 2000, Contact: Andy F. DeVito (202) 208-2701. Published (FR 12-17-99) Correction to Comment Period from 1-24-2000 to 1-17-2000.
EIS No. 990469, Draft EIS, COE, TX, Programmatic EIS--Upper Trinity River Basin Feasibility Study, To Provide Flood Damage Reduction, Environmental Restoration, Water Quality Improvement and Recreational Enhancement, Trinity River, Dallas-Fort Worth Metroplex, Dallas, Denton and Tarrant Counties, TX, Due: February 7, 2000, Contact: Gene T. Rice, Jr (817) 978-2110. Published (FR 12-17-99) Correction to Telephone Number.
EIS No. 990470, Draft EIS, TVA, TN, Addition of Electric Generation Peaking and Baseload Capacity at Greenfield Sites, Construction and Operation of Combustion Turbines (CTs), Haywood County, TN, Due: January 31, 2000, Contact: Gregory L. Askew, P.E. (865) 632-6418. Published (FR 12-23-99) Correction to Comment Period from 2-7-2000 to 1-31-2000.
EIS No. 990471, Final EIS, FTA, WA, Everett-to-Seattle Communter Rail Project, Construction and Operation, To Link the Cities of Everett, Mukilteo, Edmonds, Shoreline, and the Seattle Waterfront, U.S. Coast Guard, COE Section 10 and 404 Permits, Snohomish County, WA, Due: January 17, 2000, Contact: David Phillip Beal (206) 684-1883. Published (FR 12-17-99) Correction to Comment Period from 1-24-2000 to 1-17-2000.
EIS No. 990472, Final EIS, COE, NJ, Barnegat Inlet to Little Egg Inlet

Hurricane and Storm Damage Protection, Implementation, Long Beach Island, Ocean County, NJ, Due: January 17, 2000, Contact: Randy Piersol (215) 656-6577. Published (FR 12-17-99) Correction to Comment Period from 1-24-2000 to 1-17-2000.
EIS No. 990474, Draft Supplement, NOA, Fishery Management Plan (FMP), Regulatory Impact Review, Snapper-Grouper Complex, South Atlantic Region, Due: January 31, 2000, Contact: William T. Hogarth (202) 482-5916. Published (FR 12-23-99) Correction to Comment Period from 2-7-2000 to 1-31-2000.
EIS No. 990475, Draft EIS, FHW, NC, Western Wake Freeway, Transportation Improvements from NC-55 at NC-1172 (Old Smithfield Road) to NC-55 near NC-1630 (Alston Avenue), Funding and COE 404 Permit, Wake County NC, Due: February 3, 2000, Contact: Nicholas L. Graf, P.E. (919) 856-4350. The Notice for the above DEIS should have appeared in the 12-17-99 Federal Register. The 45-day Comment Period is Calculated from 12-17-99.

Dated: December 20, 1999.
William D. Dickerson,
Director, NEPA Compliance Division, Office of Federal Activities.
[FR Doc. 99-33359 Filed 12-22-99; 8:45 am]
BILLING CODE 6560-50-U

measures and proposed mitigation plans for wetlands, as well as a more thorough cumulative impacts evaluation for wetlands and air quality should be included in the final EIS.

ERP No. D–FRC–E03008–00 Rating EC2, Florida Gas Transmission Phase IV Expansion Project (Docket No. CP99–94–000), To Deliver Natural Gas to Electric Generator, FL and MS.

Summary: EPA expressed environmental concern regarding the impact of 297 acres of wetlands including 100 acres of forested wetlands, 72 perennial waterways and 62 residences within 50 ft of the construction ROW, and that the project would induce secondary development impacts. EPA requested additional information on certain alternatives/variations and of Environmental Justice.

ERP No. D–FTA–C40150–NY Rating EC2, Manhattan East Side Transit Alternatives Study, (MESA), Improve Transit Access Lower Manhattan, Lower East Side, East Midtown, Upper East Side and East Harlem, Major Investment Study, New York, NY.

Summary: EPA expressed environmental concerns regarding the air quality analysis and alternatives. EPA requested that this issue be clarified and be included in the next document.

ERP No. D–NPS–C61010–NJ Rating EC2, Great Egg Harbor National Scenic and Recreation River, Comprehensive Management Plan, Implementation, Atlantic Gloucester, Camden and Cape May Counties, NJ.

Summary: EPA expressed environmental concerns with the CMP recommendations to enhance and protect the River's water quality. The final EIS should include a funding plan, and a detailed plan for periodic evaluation of the implementation and success of the CMP.

ERP No. D–NPS–F39038–00 Rating EC2, Lower Saint Croix National Scenic Riverway Cooperative Management Plan, Implementation, MN and WI.

Summary: EPA expressed concerns regarding potential water quality impacts and the lack of baseline data/indicators. EPA requested that these issues be clarified in the final document.

ERP No. D–USN–C11016–NY Rating EC2, Brooklyn Naval Station Disposal and Reuse, Implementation, King County, NY.

Summary: EPA expressed environmental concerns regarding impacts to the Brooklyn/Queens Aquifer System and historic resources, and requested that additional information be presented in the final EIS to address these issues.

Final EISs

ERP No. F–AFS–K65307–CA Herger-Feinstein Quincy Library Group Forest Recovery Act, Establishing and Conducting a Pilot Project, Lassen, Plumas and Tahoe National Forests, Shasta, Lassen, Tehama, Yuba, Plumas and Battle Counties, CA.

Summary: EPA expressed environmental objections with the designation of Alternative 3 as the "environmentally preferable alternative," given Alternative 5 would provide maximum level of resource protection with the minimum level of new disturbance. EPA suggested that the ROD specify mitigation for the new road construction and provide a map of spotted owl habitat excluded from harvest.

ERP No. F–COE–L90028–WA Programmatic EIS—Puget Sound Confined Disposal Site Study, Implementation, WA.

Summary: No formal comment letter sent to the preparing agency.

ERP No. FS–AFS–L82015–ID St. Joe Noxious Weed Control Project, Implementation, St. Maries River, St. Joe River and Little North Fork Clearwater River, Benewah, Shoshone and Latah Counties, ID.

Summary: No formal comment letter sent to the preparing agency.

ERP No. F1–AFS–L61218–ID Frank Church—River of No Return Wilderness (FC–RONRW), Implementation for the Future Management of Land and Water Resource, Bitterroot, Boise, Nez Perce, Payette and Salmon-Challis National Forests, ID.

Summary: No formal comment letter was sent the preparing agency.

Dated: December 20, 1999.

William D. Dickerson,

Director, NEPA Compliance Division, Office of Federal Activities.

[FR Doc. 99–33358 Filed 12–22–99; 8:45 am]

BILLING CODE 6550–50–U

ENVIRONMENTAL PROTECTION AGENCY

[ER–FRL–6249–3]

Environmental Impact Statements; Notice of Availability

Responsible Agency: Office of Federal Activities, General Information (202) 564–7167 OR www.epa.gov/oeca/ofa. Weekly receipt of Environmental Impact Statements Filed December 13, 1999 Through December 17, 1999 Pursuant to 40 CFR 1506.9.

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EIS No. 990483, Draft EIS, NRS, Programmatic EIS—Emergency Watershed Protection Program, Improvements and Expansion, To Preserve Life and Property Threatened by Disaster-Caused Erosion and Flooding, US 50 States and Territories except Coastal Area, Due: February 15, 2000, Contact: Donald Gohmert (202) 720–3534.

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US Army Corps of Engineers
Los Angeles District

Notice of Public Review and Public Meeting
Lower Mission Creek
Flood Control Feasibility Study

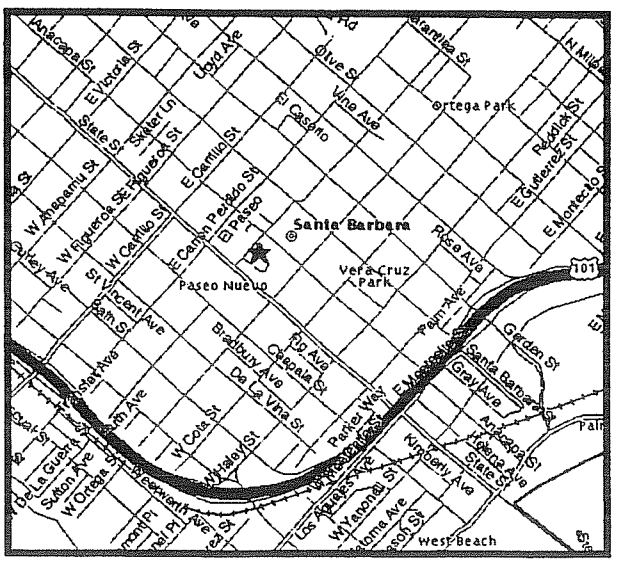
19 Jan 2000, Wednesday 6:30 p.m. at City Hall

Interested Parties:

This is an open invitation to all interested parties to provide views and comments on the U.S. Army Corps of Engineers', the Santa Barbara County Flood Control District's, and the City of Santa Barbara's plan for flood control for the lower Mission Creek in Santa Barbara, California. A public meeting on the study will be held on Jan 19, 2000 at 6:30 p.m. in the Council Chambers at Santa Barbara City Hall located at De la Guerra Plaza.

At the public meeting, the results of the draft feasibility study will be presented as well as the proposed plan, which include creek improvements to increase its conveyance capacity and environmental features to improve the riparian community along lower Mission Creek. The Draft Environmental Impact Statement (EIS) and the Draft Environmental Impact Report (EIR) for this plan will also be presented. The draft Feasibility Report, EIS and EIR, and Technical Appendices are available for public review at the Planning Division, 630 Garden Street between 8:30 a.m. to noon and 1:00 p.m. to 4:30 p.m. and at the public Library at 40 E. Anapamu Street during hours of operation. A summary of the study results and a general description of the Recommended Plan and Environmental Impacts are included in this announcement.

The purpose of this public meeting is to solicit public comments and concerns with respect to the draft feasibility study findings and the proposed Recommended Plan including the proposed future maintenance. All comments and information received will be carefully reviewed and fully considered in reaching the final feasibility study conclusions and recommendations. Comments regarding future maintenance will be considered in the Regulatory permitting process. Therefore, we urge all interested parties to participate. Anyone wishing to express their views at the meeting will be offered a full opportunity to do so. In addition, written comments may be submitted at the meeting or mailed to the Corps of Engineers at the address below. A record of proceedings will be taken during the meeting and a transcript prepared. All statements, oral or written, will become part of the official record of the study. Appropriate statements or recommendations for change will be incorporated into the final study documents.



The review period for receiving views and comments is 45 days. All written statements should be received by the Corps no later than 10 February 2000. Written comments or further information regarding the lower Mission Creek Feasibility Study or the public meeting, can be addressed to Mr. Ed Demesa, Study Manager, Plan Formulation Branch, U.S. Army Corps of Engineers, P.O. Box 532711, Los Angeles, California, 90053-2325. Mr. Demesa may also be reached by telephone at (213) 452-3796.

We have attempted to send this information to all individuals and organizations that may have an interest in the Lower Mission Creek Flood Control Project. If you know of individuals who may desire to attend and have not been contacted by us, please bring this invitation to their attention.

Directions to Meeting:
From US101 South : Take the Laguna St/Garden St exit. Turn right onto Garden St. Turn left onto E. Gutierrez St. Turn right onto Santa Barbara St. Turn left onto E De la Guerra St. The City Hall will be on the left side between Anacapa St and State St.

City of Santa Barbara

California

NOTICE OF AVAILABILITY OF DRAFT ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT – ENV92 0005 AND NOTICE OF PUBLIC HEARING

PROJECT LOCATION: LOWER MISSION CREEK, BETWEEN CANON PERDIDO STREET AND CABRILLO BOULEVARD

PROJECT DESCRIPTION: The EIS/EIR specifically addresses Alternatives 12, 6,8 and 1, the No Action Alternative. These alternatives would increase the channel capacity to 3,400 cubic feet per second (cfs) and would provide a 20-year level of protection. Channel improvements would occur on approximately the last mile of the creek between the Canon Perdido Street Bridge at the upstream end and the Cabrillo Boulevard Bridge near the outlet. Alternative 12, the National Economic Development (NED) and tentatively recommended plan, includes: natural creek bottom; replacement of five bridges, streamlining bedslope, installing a culvert that bypasses the oxbow; stabilizing creek banks by using a combination of short vertical walls and vegetated riprap in most places with vertical walls at bridges and at other constrained locations; and construction of habitat zones and a wetland. Alternative 6 consists of: natural creek bottom; stabilized creek banks with vertical walls and vegetated stepped banks; replacement of seven bridges; streamlining bedslope; construction of habitat zones and a wetland; and the oxbow would widened to contain higher flows. Alternative 8 consists of: natural creek bottom; stabilization of creek banks with vertical concrete walls; replacement of five bridges; streamlining bedslope; installing a culvert that bypasses the oxbow; and construction of habitat zones and a wetland. Future maintenance is an integral part of the project design for all alternatives identified above, and is included in the project description for the life of the project. Project design incorporates planting of vegetation along upper banks, within vacant remnant land parcels, and construction of a wetland.

A Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) has been prepared for this project and is available for review and comment. The Draft EIS/EIR examines environmental impacts which may be associated with this project. Significant environmental effects identified in the Draft EIS/EIR which are anticipated as a result of the project include impacts related to biological resources, cultural resources, traffic, water quality, air quality and noise. This Draft EIS/EIR has been prepared jointly by the City of Santa Barbara and the Los Angeles District, U.S. Army Corps of Engineers. An underground fuel tank was previously located at 315 Chapala Street, Site # 90042, no Assessor's Parcel Number (former APN 37-245-16, retired by County Assessor after property was purchased by CalTrans for U.S. Highway 101 right-of-way) and had been identified on one of the lists enumerated under Section 65962.5 of the Government Code. This tank has since been removed and soil remediation has been completed as required by applicable federal, state, and local regulations. Property at 324 De la Vina Street (Site ID #151, APN 037-245-14) and at 220 West Gutierrez Street (site ID #57, APN 37-202-06) have been identified as locations which require site remediation on one of the lists enumerated under Section 65962.5 of the Government Code. More detail on these two sites is provided in the raft EIS/EIR.

CITY OF SANTA BARBARA
COMMUNITY DEVELOPMENT DEPARTMENT
PLANNING DIVISION
POST OFFICE BOX 1990
SANTA BARBARA, CA 93102-1990

AN IMPORTANT NOTICE
CONCERNING YOUR NEIGHBO JOOD

The City of Santa Barbara encourages the public to provide written comment on this and other projects. The Draft EIS/EIR is available for review at the Planning Division, 630 Garden Street between 8:30 a.m. to noon and 1:00 p.m. to 4:30 p.m. and at the Public Library at 40 E. Anapamu Street during hours of operation.

The public review period begins on **December 27, 1999**. Comments on the Draft EIS/EIR must be submitted by **February 10, 2000, at 4:30 p.m.**

Please send your comments to:

City of Santa Barbara
Planning Division
Attn: **Jan Hubbell, Project Planner**
P.O. Box 1990
Santa Barbara, CA 93102-1990

A hearing to take public comments on this document will be held before the Planning Commission on **January 19, 2000** at 6:30 p.m. in the Council Chambers at City Hall. If you have any questions please contact **Jan Hubbell, Project Planner**, at (805) 564-5470 between 8:30 a.m. to noon and 1:00 p.m. to 4:30 p.m.

After public review of the EIS/EIR, the City of Santa Barbara and the U.S. Army Corps of Engineers will respond to comments and prepare a Final EIS/EIR. The Planning Commission will then certify the Final S/EIR. A notice of this hearing will be provided.

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse

Gray Davis
GOVERNOR

Loretta Lynch
DIRECTOR

ACKNOWLEDGEMENT OF RECEIPT

RECEIVED
JAN 03 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

DATE: December 29, 1999

TO: JANICE M. HUBBELL
CITY OF SANTA BARBARA, PLANNING DIVISION
P.O.BOX 1990
SANTA BARBARA, CA 93102-1990

RE: LOWER MISSION CREEK FLOOD CONTROL PROJECT
SCH#: 98101061

This is to acknowledge that the State Clearinghouse has received your environmental document for state review. The review period assigned by the State Clearinghouse is:

Review Start Date: December 28, 1999
Review End Date: February 10, 2000

We have distributed your document to the following agencies and departments:

California Coastal Commission
California Highway Patrol
Caltrans, District 5
Department of Boating and Waterways
Department of Fish and Game, Region 5
Department of Parks and Recreation
Department of Water Resources
Native American Heritage Commission
Office of Historic Preservation
Public Utilities Commission
Regional Water Quality Control Board, Region 3
Resources Agency
State Lands Commission

The State Clearinghouse will provide a closing letter with any state agency comments to your attention on the date following the close of the review period.

Thank you for your participation in the State Clearinghouse review process.

1400 TENTH STREET P.O. BOX 3044 SACRAMENTO, CALIFORNIA 95812-3044
916-445-0613 FAX 916-323-3018 WWW.OPR.CA.GOV/CLEARINGHOUSE.HTML

home sweet home Delivery 966-7171

CITY OF SANTA BARBARA

NOTICE OF PUBLIC HEARING OF THE PLANNING COMMISSION
JANUARY 19, 2000
6:30 P.M.
CITY HALL - DE LA GUERRA PLAZA
CITY COUNCIL CHAMBERS

NOTICE OF AVAILABILITY OF DRAFT - ENVIRONMENTAL IMPACT STATEMENT/ENVIRONMENTAL IMPACT REPORT – ENV92 0005 AND NOTICE OF PUBLIC HEARING

PROJECT LOCATION: LOWER MISSION CREEK, BETWEEN CANON PERDIDO STREET AND CABRILLO BOULEVARD

PROJECT DESCRIPTION: The EIS/EIR specifically addresses Alternatives 12, 6, 8, and 1 (the No Action Alternative). These alternatives would increase the channel capacity to 3,400 cubic feet per second (cfs) and would provide a 20-year level of protection. Channel improvements would occur on approximately the last mile of the creek between the Canon Perdido Street Bridge at the upstream end and the Cabrillo Boulevard Bridge near the outlet. Future maintenance is an integral part of the project design for all alternatives identified above, and is included in the project description for the life of the project. Project design incorporates planting of vegetation along upper banks, within vacant remnant land parcels, and construction of a wetland.

A Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) has been prepared for this project and is available for review and comment. The Draft EIS/EIR examines environmental impacts which may be associated with this project. Significant environmental effects identified in the Draft EIS/EIR which are anticipated as a result of the project include impacts related to biological resources, cultural resources, traffic, water quality, air quality and noise. This Draft EIS/EIR has been prepared jointly by the City of Santa Barbara and the Los Angeles District, U.S. Army Corps of Engineers. An underground fuel tank was previously located at 315 Chapala Street, Site # 90042, no Assessor's Parcel Number (former APN 37-245-16, retired by County Assessor after property was purchased by CalTrans for U.S. Highway 101 right-of-way) and had been identified on one of the lists enumerated under Section 65962.5 of the Government Code. This tank has since been removed and soil remediation has been completed as required by applicable federal, state, and local regulations. Properties at 324 De la Vina Street (Site ID #151, APN 037-245-14) and at 220 West Gutierrez Street (Site ID #57, APN 37-202-06) have been identified as locations which require site remediation on one of the lists enumerated under Section 65962.5 of the Government Code. More detail on these two sites is provided in the Draft EIS/EIR.

The City of Santa Barbara encourages the public to provide written comment on this and other projects. The Draft EIS/EIR is available for review at the Planning Division, 630 Garden Street between 8:30 a.m. to noon and 1:00 p.m. to 4:30 p.m. and at the Public Library at 40 E. Anapamu Street during hours of operation.

The public review period began on December 27, 1999. Comments on the Draft EIS/EIR must be submitted by **February 10, 2000 at 4:30 p.m.**

After public review of the EIS/EIR, the City of Santa Barbara and the U.S. Army Corps of Engineers will respond to comments and prepare a Final EIS/EIR. The Planning Commission will then certify the Final EIS/EIR. A notice of this hearing will be provided.

In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Planning Division at (805) 564-5470. Notification at least 48 hours prior to the meeting will enable the City to make reasonable arrangements.

If you have any questions, wish to know more about this application, or wish to review the document, please contact Jan Hubbell, Project Planner, from 8:30 a.m. to 12:00 noon and 1:00 p.m. to 4:30 p.m., Monday through Friday. in the Community Development Department at 564-5470.

Notice of Preparation

To: **All Responsible and Trustee Agencies and Interested Parties**

Subject: Notice of Preparation of a Draft Environmental Impact Statement/Environmental Impact Report

Lead Agencies:

CEQA: City of Santa Barbara
Planning Division
Post Office Box 1990
Santa Barbara, CA 93102

Contact: Janice M. Hubbell., Project Planner

NEPA: Commander,
U.S. Army Corps of Engineers, Los Angeles District
Environmental Design Section, CESPL-PD-RL
P.O. Box 532711
Los Angeles, CA 900 53-2325

Contacts: Ms. Joy Jaiswal, Technical Manager
Mr. Ed Demesa, Study Manager

The City of Santa Barbara will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the project identified below. The U.S. Army Corps of Engineers will be the Lead Agency for the Environmental Impact Statement (EIS). The EIR and EIS will be prepared as a joint document. We need to know the views of you or your agency as to the scope and content of the environmental information which is germane to your agency's statutory responsibilities in connection with the proposed project. Responsible and Trustee agencies will need to use the EIR/EIS prepared by our agency when considering your permit or other approval for the project.

The project description, location, and the potential environmental effects are contained in the attached materials. A copy of the Initial Study ([X] is [ ] is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but **not later than 30 days** after receipt of this notice.

A Scoping Meeting will be held on October 29, 1998 before the Planning Commission and the U.S. Army Corps of Engineers. The meeting will begin at 7:00 PM and will be held in the City Council Chambers, City Hall, De la Guerra Plaza, Santa Barbara.

Please send your response to Janice Hubbell and/or Joy Jaiswal or Ed Demesa at the addresses shown above. We will need the name for a contact person in your agency.

Project Title: Lower Mission Creek Flood Control Project

Project Location: Mission Creek, between Canon Perdido Street and the Pacific Ocean, City of Santa Barbara, County of Santa Barbara

Project Description: Proposal to channelize Mission Creek from Carrillo Street to the Pacific Ocean in order to provide flood protection. See attached Initial Study and Notice of Intent for more detail.

Date September 28, 1998

Signature: Janice M. Hubbell

Project No.: ENV98-0330

Title: Project Planner

APN: Several

Telephone: (805) 564-5470

ZONE: C-2, R-3, R-4, P-R, HRC-1, HRC-2 and S-D-3

Reference: California Administrative Code, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

[J:/jh/mis/miscreek.nop]

REVISED:3-20-91

17 Jan 1999

Jan,

Per Joy, I have sent out copy/ies of the report to the recipients that are hi-lited in the attached list and you'll be distributing the report for the remaining addressees. I'm still looking for the mailing addresses for the following agencies:

Dept of Transportation;
Cal Dept of Housing and Community;
California Dept of Real estate, and
State Reclamation Board.

These would probably go out on Monday (20 Dec).

You should receive 50 copies of the main report, all Fedexed today. Three copies of the appendices will be mailed to you by Rebecca (RBF) on Monday. RBF is printing the appendices and we're printing the main report here at the District.

I'll provide Tom Fayram several copies for his use, not including the copies that you'll mail out to the county agencies that are included in the mailing list.

I'm sending out the main report to the libraries today and the appendices will follow on Monday.

Please give me a call upon receipt.

Thank You,

Ed Demesa
(213) 452-3796

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

December 15, 1999

Office of the Chief
Environmental Resources Branch

To Interested Parties:

Enclosed for your review and comment is a copy of the Draft Feasibility Report and Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Lower Mission Creek Flood Control Project, Santa Barbara, Santa Barbara County, California. The study is limited to the final 1.2 miles of the creek, between Canon Perdido Street and Cabrillo Boulevard This study does not extend to lagoon. The proposed project would provide 3400 cubic feet per second (cfs) of capacity and approximately a 20-year level of flood protection.

The Environmental Impact Statement/Environmental Impact Report (EIS/EIR) evaluates four feasible alternatives for the environmental evaluation. They are Alternative 12, 6, 8 and No Action Alternatives (see details in the EIS/EIR Section 3). Alternative No. 12 is the National Economic Development (NED) and tentatively Recommended Plan. This alternative is also the environmentally superior plan compared to all other alternatives evaluated for the environmental analysis.

Alternative 12 consists of constructing a soft bottom creek, stabilizing the creek banks with a combination of short vertical walls along the lower banks and vegetated riprap along the upper banks, replacement of five bridges; installation of a bypass culvert, and streamlining the bedslope. This alternative provides an opportunity for construction of a wetland and habitat expansion zones. The habitat expansion zones would provide a dual benefit by expanding riparian habitat along the creek and creating passive park areas for use by area residents. Future maintenance of the constructed channel is essential to retain the form and design capacity of the creek. Impacts related to future maintenance are addressed in this document. Chapters 6 through 19 provide existing conditions and address impacts related to this proposed project. Environmental commitments and mitigation measures are included to avoid/reduce or minimize impacts to natural and cultural resources.

The U.S. Army Corps of Engineers is the Federal lead agency responsible for complying with the National Environmental Policy Act (NEPA). Santa Barbara County Flood Control District (SBCFCD) and the City of Santa Barbara are the local responsible agencies for complying with the California Environmental Quality Act (CEQA). The SBCFCD is a project proponent responsible for the future maintenance of the constructed project. This environmental document is written in compliance with NEPA, CEQA and other applicable environmental laws and regulations.

A public hearing on the Draft Feasibility Report and Draft EIS/EIR is scheduled for January 19, 2000, at 6:30 pm.; in Santa Barbara City Hall, Council Chambers; 730 Anacapa Street, Santa Barbara, California.

Should you have any comments on the proposed project, please respond within forty-five (45) days. The comment period begins December 27, 1999, and extends through February 10, 2000. Please address your comments to:

U.S. Army Corps of Engineers
Los Angeles District
ATTN: Ms. Joy Jaiswal (CESPL-PD-RL)
and
Mr. Ed Demesa (CESPL-PD-WA)
P.O. Box 532711
Los Angeles, California 90053-2325

Comments must be received by February 10, 2000. Please direct your comments to the attention of Ms. Joy Jaiswal of my staff at (213) 452-3871 or FAX (213) 452-4219. If you have questions on the Draft Feasibility Report, please contact Mr. Ed Demesa, (213) 452- 3796. Ms. Janice M. Hubbell, AICP, Project Planner is a point of contact at the City of Santa Barbara. Ms. Hubbell can be reached at (805) 564-5470. Thank you for your review of this document.

Sincerely,

Robert E. Koplin, P.E
Chief, Planning Division

Enclosure

SUMMARY
PUBLIC MEETING (HEARING)
DRAFT EIS/EIR
JANUARY 19, 2000

The U.S. Army Corps of Engineers (Corps), the Santa Barbara County Flood Control District (Flood Control District), and the City of Santa Barbara (City) held a public meeting on Wednesday evening, January 19, 2000, 6:30 PM, to give the public an opportunity to comment orally on the Draft Feasibility Study and Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR). The public meeting was held in the Council Chambers at Santa Barbara City Hall located at De la Guerra Plaza.

A verbatim transcript of public meeting proceedings from a videotape was prepared. The following is a categorized compilation of questions, comments, and concerns raised at the public meeting. A brief response of how the comments have been addressed follows each of the topics.

Concerns – Project Alternatives

- Add another plan: extend the box culvert from its current outlet point near the Chapala Street Bridge to the end of Mission Creek. If trees cannot be planted on top of the culvert, substitute other vegetation.
- Increase both habitat and flood protection by buying more land along the corridor. Relegating the riparian corridor to two 10-foot strips in the pocket riparian zones with virtually nothing south of Highway 101 is inadequate.
- What are the differences between the channel width alternatives for the Mason Street area? Why is it important?

Concerns – Project Design:

- Proposed acquisition of the property for an expanded habitat zone at the corner of the project at De la Guerra: recommend only using the slope as the expanded habitat zone in order to save the building. *(Kelly–City)*
- Extend the vertical wall that is part of Ortega Bridge a short distance to save another dwelling. *(Kelly–City)*
- Expand the landscaping behind the vertical wall at the Bath Street Bridge to allow vegetation to grow down and behind the wall. *(Kelly–City)*
- At Cota, slightly change the bridge alignment and perhaps extend the vertical wall a short distance to save the dwelling, which has some historic significance. *(Kelly–City)*

- Reduce the capacity of the "sewer" lagoon by putting a portion of its capacity in a box culvert that would run down to the ocean or State Street. Might be able to clean up the lagoon better. Plant vegetation on both sides of the lagoon to create a canopy. Install a lighted walkway with trees and plants on top of the culvert.
- Build a box culvert in the De La Vina area, as well, and cover it.
- Re the box channel across the railroad yards: open it up, go straight, and make it really big (300 feet wide) by getting rid of the parking lot, and put the railroad on a trestle. Use pumps to pull the water out rapidly.
- Narrow State and Cabrillo streets to give the creek more room to expand.
- Vertical walls should not extend all the way up to the estuary.
- The design has too much concrete.

Response – Project Design:

Concerns – The Buried Culvert at the "Oxbow"

- We need more information about how much excess flow this culvert will take away.
- Is there any part of the design of the box culvert that could assist in reducing the water discharge at that point? *(Planning Commissioner)*

Response – The Buried Culvert at the "Oxbow":

Concerns – Flood Control

- What type of protection will be project provide for floods that exceed the 20-year storm? *(Planning Commissioner)*
- If the capacity of the channel above the project area is 7,000 cfs, what is going to happen when we have a greater than 20-year storm?
- Is there a cutoff point from a cost-benefit standpoint? *(Planning Commissioner)*
- The project should be redefined to accommodate 3,210 cubic feet per second (cfs), which is what the consensus group agreed to. This would narrow the channel a couple of feet, which is important.
- What effect will increasing Mission Creek's capacity have on the area below the project area?

- What would it take to give us greater capacity, either through some alternative channel or some alternative solution?

Response – Flood Control:

Concerns – Erosion Problems

- Historically, flood water has washed out behind the vertical walls and taken away the bank. Isn't that still possible with the vertical walls in the project design? *(Planning Commissioner)*
- We need more specific examples of what you're going to do to ensure that the earth doesn't wash away.

Response – Erosion Problems:

Concerns – Biological Resources

- Vertical walls on the sides of the estuary are not compatible with tidewater Gobi habitat, which requires vegetated sloping banks.
- The area below Cabrillo Bridge is very important for tidewater Gobi habitat and should be included in a comprehensive creek management plan.
- The channel bed will be a biological desert (because of silt removal and herbicide spraying), leaving only thin strips of vegetation along the banks—where there are backs.
- Widening the creek bed increases maintenance responsibilities, which have environmental impacts. The creek bed doesn't have high environmental values because of maintenance. The creek banks do, since they contain the habitat. They should be made wider by buying stream-side properties and further laying back the banks where there are proposed walls.
- When was the last time a steelhead trout was caught in Mission Creek?
- The EIS/EIR should contain more details on the environmental impacts of flood control on estuary activity. *(Planning Commissioner)*
- The EIS/EIR should contain a discussion of the Laguna wetlands proposals that are part of the project. *(Planning Commissioner)*

Response – Biological Resources:

Concerns – Water Quality

- Include in the final report more discussion of the hazardous materials discharging into the creek. *(Planning Commissioner)*
- Creek widening may accommodate even more shopping carts and other trash.
- The alternatives do not provide adequate shading to maintain proper water temperatures, which are important because dissolved oxygen and nutrient balances depend on maintaining temperatures and the proper ranges.
- The vertical walls minimize the potential for vegetation that is necessary to enhance water quality.
- The preservation of historic buildings should not take priority over water quality. It would be better to relocate the historic structures.
- Recommendation on how the project should deal with contaminants identified in the County/City Joint Stormwater Pollution Prevention Plan: install filters on the storm drain outlets.
- The project should take responsibility for and address the state and health of the creek waters all the way to the ocean.
- In the estuary area, sloped vegetated banks along the edges are better than concrete vertical walls to act as a biofilter. The plants will remove some of the pollutants as the water goes through them.
- Increase the native plantings along and on top of the banks to enhance biofiltration.

Response – Water Quality:

Concerns – Aesthetics

- Can aesthetic improvements to the Cabrillo Street Bridge be included in the project? *(Planning Commissioner)*
- Include in the final report an inventory of trees so that we can consider whether we want to lose them or save them and lose something else. *(Planning Commissioner)*
- Include in the final report a discussion of the bridge walls to be demolished and whether the old stone can be saved, conserved, reused in other parts of the project, or stored at the city for some future use. *(Planning Commissioner)*

- Vertical walls and the bridges should be replicated in Italian stone mason fashion.
- One-gallon trees are insufficient. They should be 15-gallon at a minimum. And there should be many more.
- The proposed aesthetic treatments should take into the account the views from the bridges as well as the banks. You're going to see the cement from the bridges. You should put in a lot more bank vegetation to hide the cement. The goal should be to make lower Mission Creek looking like Rockingham Park and the Museum of Natural History as much as possible.
- We need more specific examples (photos) of aesthetic treatment proposals for the bridges and banks. Sticking a row of trees on the top of a bank won't do much.
- If you're going to provide trees to homeowners to plant in their backyards, you must guide them as to the right places and planting procedures, or it won't do any good.
- What is the culvert bypass going to look like?
- Widening the creek means that you won't get shade in the creek bed from the trees for decades.
- Use computer modeling to generate shading patterns from the trees. *(Planning Commissioner)*

Response – Aesthetics:

Concerns – Public Safety

- Walkway across the creek could create lighting, security, and liability problems.
- Lighting should be installed in the pocket parks and on the bridges to reduce the possibility of vandalism.

Response – Public Safety:

Concerns – Socioeconomics

- The proposed walkway along the creek in the vicinity of the Chapala Street Bridge would adversely affect the neighborhood: bright lights shining into homes and a loss of privacy. It would be better to extend the culvert.
- Property owner objection to move house at 116 Chapala Street just to create a pocket park. City's assessment to determine which structures are cost-efficient to move is somewhat flawed. No one has determined whether this house is movable.

- Buildings should be moved out of the riparian corridor because they are encroachments.
- Vertical walls should not be extended to protect structures. There is too much vertical wall.
- Four structures now slated for saving by extending the vertical wall should be reconsidered for removal: on Ortega Street, at the corner of Ortega and Bath, on Cota and Bath, and near De La Vina and Halley. *(Planning Commissioner)*

Response – Socioeconomics:

Concerns – Recreation

- What will public access to the creek be? People will have a vested interest in keeping the creek clean if they have greater access. *(Planning Commissioner)*
- Is there an opportunity to use the lower creek around State and Cabrillo as a tourist attraction (maybe a creek walk)? *(Planning Commissioner)*
- Support pocket parks.

Response – Recreation:

Concerns – Maintenance

- How will you take care of trash in the creek? *(Planning Commissioner)*
- Have you given consideration to a street-sweeping program to help keep the creek clean? *(Planning Commissioner)*
- What will you do if flooding and erosion destroy the vertical walls? *(Planning Commissioner)*
- Who will maintain the box culvert, and how will it be maintained? *(Planning Commissioner)*
- Install permanent trash cans at the bridges.
- Trash in the creek needs to be cleaned out more than four times a year.
- Maintenance should result in minimal disruption to native plantings on the creek bottom and slopes.
- Clear the streambed in a mosaic pattern to leave some plants at different periods of time to enhance regrowth.

- The high threshold for silt removal should be 25 percent.
- Disturbances upstream that would contribute to erosion should be strictly monitored and lot allowed.
- The maintenance plan should be developed with community participation.
- The EIS/EIR should contain more details on the environmental impacts of abatement measures, application of herbicides, and scraping or scouring. *(Planning Commissioner)*

Response – Maintenance:

Concerns – Cumulative Impacts

- The La Entrada Project at the intersection of State and Mason Streets. Did the City of Santa Barbara notify the Corps of Engineers of this project? Were the Alternative 12's impacts on this project evaluated in the EIS/EIR?
- There must be a buffer between the La Entrada Project and the Harbor View Inn Project and the flood control project.

Response – Cumulative Impacts:

Concerns – Other

- Planning Commission should look at ways to guide future development so that it doesn't add to water coming down the creek.
- This project should be just the initial phase of a long-range plan to restore all reaches of Mission Creek (establishing adequate buffer zones, acquiring properties and easements over time, compelling property owners to remove encroachments and impervious surfaces from the creek, and providing incentives for gradual retreat).
- The City of Santa Barbara Redevelopment Agency funds of $2.5 million to augment the restoration components of the flood control project should be spent to buying additional riparian properties for riparian habitat.

APPENDIX - I -2

SUMMARY OF PUBLIC HEARING
LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

SUMMARY
PUBLIC MEETING (HEARING)
DRAFT EIS/EIR
JANUARY 19, 2000

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- What is the culvert bypass going to look like?
- Widening the creek means that you won't get shade in the creek bed from the trees for decades.
- Use computer modeling to generate shading patterns from the trees. *(Planning Commissioner)*

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- Walkway across the creek could create lighting, security, and liability problems.
- Lighting should be installed in the pocket parks and on the bridges to reduce the possibility of vandalism.

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- The maintenance plan should be developed with community participation.
- The EIS/EIR should contain more details on the environmental impacts of abatement measures, application of herbicides, and scraping or scouring. *(Planning Commissioner)*

Concerns – Cumulative Impacts:

- The La Entrada Project at the intersection of State and Mason Streets. Did the City of Santa Barbara notify the Corps of Engineers of this project? Were the Alternative 12's impacts on this project evaluated in the EIS/EIR?
- There must be a buffer between the La Entrada Project and the Harbor View Inn Project and the flood control project.

Concerns – Other:

- Planning Commission should look at ways to guide future development so that it doesn't add to water coming down the creek.
- This project should be just the initial phase of a long-range plan to restore all reaches of Mission Creek (establishing adequate buffer zones, acquiring properties and easements over time, compelling property owners to remove encroachments and impervious surfaces from the creek, and providing incentives for gradual retreat).
- The City of Santa Barbara Redevelopment Agency funds of $2.5 million to augment the restoration components of the flood control project should be spent to buying additional riparian properties for riparian habitat.

APPENDIX - J

CORRESPONDENCE AND DISTRIBUTION LIST FOR ENVIRONMENTAL IMPACT STATEMENT/ ENVIRONMENTAL IMPACT REPORT

LOWER MISSION CREEK FLOOD CONTROL PROJECT SANTA BARBARA, CALIFORNIA

SEPTEMBER 2000

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

June 27, 2000

Office of the Chief
Environmental Resources Branch

Mr. Daniel Abeyta
Acting State Historic Preservation Officer
Office of Historic Preservation
P.O. Box 942896
Sacramento, California 94296-0001

Dear Mr. Abeyta:

We are writing in regard to completing Section 106 compliance for the Lower Mission Creek Flood Control Project (LMCFCP) in the City of Santa Barbara, Santa Barbara County. The LMCFCP is located in the southern part of Santa Barbara and extends 1.2 miles from Canon Perdido Street to Cabrillo Boulevard (Enclosure 1). We wrote to your office on January 3, 2000 as required under 36 CFR 800.3(c)(3). We received a reply dated January 27, 2000. Our January 3 letter explained the project and all of the steps that had been taken toward identifying historic properties within the area of potential effects (APE). Your project file number is COE000106A. We have been in consultation with Ms. Natalie Lindquist of your staff regarding this project.

The LMCFCP was originally surveyed in 1985 for a larger project that was dropped. A recent survey was conducted by the Corps of Engineers (COE) in 1998 for this particular project. At the time of that survey, the APE was restricted to the channel. The results of the survey are in the enclosed report entitled "*Cultural Resources Survey Of 1.2 Miles Of Lower Mission Creek For The Lower Mission Creek Flood Control Project In The City Of Santa Barbara, Santa Barbara County, California* " that was prepared by COE staff archeologist, Richard Perry (Enclosure 2).

During the alternatives formulation process the decision was made to widen the channel in a number of locations to a top width of 70-feet to accommodate a 3400 cfs flow. Following this decision, the City of Santa Barbara contracted with Post/Hazeltine Associates (PHA), to conduct an architectural survey of the APE. The results of their survey are in the enclosed report entitled "*Phase I/II Arcitectural* [sic] *Resources Report for The Mission Creek Flood Control Project.*" Their survey was based on earlier project maps that have since been updated. However, their survey was comprehensive and some houses and structures that were originally scheduled for removal, alteration, or relocation will be avoided (Enclosure 3). A list of all the structures in the APE that were surveyed by PHA are in the enclosed list (Enclosure

4). They are grouped according to which map they are found on. They are listed as Maps 1 through 4 which correspond with the four current project maps (Enclosure 5) beginning with the eastern end of the APE at Cabrillo Boulevard. The maps in the PHA report show the building that were going to be affected with diagonal hachuring. The number of buildings to be removed has been greatly reduced. The project has been redesigned to insure avoidance of any buildings or structures that would have been National Register eligible

The list of non-eligible and eligible structures and buildings in Enclosure 4 also has the corresponding page number in the PHA report for reference. The Mission Creek Diversion and the Chapala Street Bridge are no longer in the APE. The project was redesigned to have the water flow through an underground culvert. However, due to their close proximity to the APE and in the event that there is a final project redesign, we have concluded that they should be included in our compliance efforts. The Mission Creek Diversion was previously determined eligible as part of the Railroad Depot Historic property. The eight houses that are considered by PHA to be potentially eligible for National Register listed are in the APE but were evaluated for their architectural significance, not the historic setting. Another project element requires removal and reconstruction of four bridges to accommodate the expanded water flow. They are listed in Table 3. on page 12 of the survey report. The bridges are on Ortega, Cota, De la Vina at Haley, and Mason Streets. All are category 5 level of significance on the Caltrans list which means that they are not eligible for NHRP listing (Enclosure 5).

An additional feature of the PHA report was that they identified two historic districts that contain some of these buildings and structures that were evaluated. A number of the buildings in the APE were eligible on the local and State level, but failed to meet the criteria for inclusion in the National Register. The two historic districts are known as the Waterfront, and the West Downtown Neighborhoods. They are fully described on pages 24 through 31, and are shown on the map in Figure 6. on page 175.

We have agreed with the Caltrans bridge survey and have determined that bridges numbered 51C0246; 51C0247, 51C0287, and 51C0301 are not eligible for inclusion in the National Register of Historic Places. After conducting a survey of the Lower Mission Creek Channel and reviewing the PHA architectural survey report, we have determined that the following houses are eligible for inclusion in the National Register under Criterion c. for their architectural features. Furthermore, they are eligible as contributing elements to the two historic districts:

Waterfront Neighborhood Historic District:
20 West Mason Street, 116 Chapala Street, 118 Chapala Street, 120 Chapala Street, and Chapala Street pony truss Bridge. The Mission Creek Diversion has already been determined eligible for the National Register as part of the Railroad Depot National Register property.

West Downtown Neighborhood Historic District:
311/313 West Ortega Street, and 536 Bath Street

We have also determined that since the buildings and structures are eligible under Criterion c. for their architectural design and not their historic setting, and that the four bridges from the Caltrans list are not eligible for listing, the Lower Mission Creek Flood Control project as planned will not adversely effect National Register listed or eligible properties.

Correspondence may be sent to:

Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

We request that you review the enclosed information. If you agree with our determinations of eligibility and no adverse effect, we would appreciate your concurrence. We understand that you have 30 days in which to respond to this request, otherwise we will proceed according to the provisions stated in 36 CFR 800.4(d) and consider that we have discharged our obligations under Section 106. If you have any questions concerning this project or the determination, please contact project archeologist, Mr. Richard Perry, at (213) 452-3855, or by Email at rperry@spl.usace.army.mil.

Sincerely,

Robert E. Koplin, P.E.
Chief, Planning Division

Enclosures

STATE OF CALIFORNIA – THE RESOURCES AGENCY

GRAY DAVIS, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
ACRAMENTO, CA 94296-0001
16) 653-6624 Fax: (916) 653-9824
alshpo@ohp.parks.ca.gov

August 3, 2000

Reply To: COE000106A

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 832711
Los Angeles, CA 90053-2325

Re: Lower Mission Creek Flood Control Study, Santa Barbara, CA

Dear Mr. Koplin:

Thank you for your letters of June 27 and August 1, 2000, requesting my review and comments in regard to the Corps of Engineer's (COE) efforts to determine whether the project described above may affect historic properties. You have done this, and are consulting with me, in order to comply with Section 106 of the National Historic Preservation Act and implementing regulations codified at 36 CFR Part 800.

The COE has determined that the following properties are not eligible for the National Register of Historic Places (NRHP):

- Bridge 51C0246 – the Mission Creek Bridge between Bath and Dela Vina Street
- Bridge 51C0247 – the Mission Creek Bridge at the intersection of Dela Vina and Haley Street
- Bridge 51C0287 – the Mission Creek Bridge between Chapla and State Street
- Bridge 51C0301 – the Mission Creek Bridge between Castillo and Bath Street
- 116 Chapala Street, Santa Barbara, CA
- 134 Chapala Street, Santa Barbara, CA
- 29 State Street, Santa Barbara, CA
- 15 W Mason Street, Santa Barbara, CA
- 129 W Haley Street, Santa Barbara, CA
- 208 W Haley Street, Santa Barbara, CA
- 434 De La Vina Street, Santa Barbara, CA
- 221 W Cota Street, Santa Barbara, CA
- 230 W Cota Street, Santa Barbara, CA
- 532 Bath Street, Santa Barbara, CA
- 536 Bath Street, Santa Barbara, CA
- 631 Bath Street, Santa Barbara, CA
- 633 Bath Street, Santa Barbara, CA
- 303 W Ortega Street, Santa Barbara, CA
- 306 W Ortega Street, Santa Barbara, CA
- 308 W Ortega Street, Santa Barbara, CA
- 326 W De la Guerra, Santa Barbara, CA

In addition the COE has determined that the following are eligible for the NRHP under Criterion C:

- 118 Chapala Street, Santa Barbara, CA

STATE OF CALIFORNIA – THE RESOURCES AGENCY GRAY DAVIS, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
ACRAMENTO, CA 94296-0001
16) 653-6624 Fax: (916) 653-9824
alshpo@ohp.parks.ca.gov

August 3, 2000

Reply To: COE000106A

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 832711
Los Angeles, CA 90053-2325

Re: Lower Mission Creek Flood Control Study, Santa Barbara, CA

Dear Mr. Koplin:

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The COE has determined that the following properties are not eligible for the National Register of Historic Places (NRHP):

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- Bridge 51C0247 – the Mission Creek Bridge at the intersection of Dela Vina and Haley Street
- Bridge 51C0287 – the Mission Creek Bridge between Chapla and State Street
- Bridge 51C0301 – the Mission Creek Bridge between Castillo and Bath Street
- 116 Chapala Street, Santa Barbara, CA
- 134 Chapala Street, Santa Barbara, CA
- 29 State Street, Santa Barbara, CA
- 15 W Mason Street, Santa Barbara, CA
- 129 W Haley Street, Santa Barbara, CA
- 208 W Haley Street, Santa Barbara, CA
- 434 De La Vina Street, Santa Barbara, CA
- 221 W Cota Street, Santa Barbara, CA
- 230 W Cota Street, Santa Barbara, CA
- 532 Bath Street, Santa Barbara, CA
- 536 Bath Street, Santa Barbara, CA
- 631 Bath Street, Santa Barbara, CA
- 633 Bath Street, Santa Barbara, CA
- 303 W Ortega Street, Santa Barbara, CA
- 306 W Ortega Street, Santa Barbara, CA
- 308 W Ortega Street, Santa Barbara, CA
- 326 W De la Guerra, Santa Barbara, CA

In addition the COE has determined that the following are eligible for the NRHP under Criterion C:

- 118 Chapala Street, Santa Barbara, CA
- 120 Chapala Street, Santa Barbara, CA
- 20 W Mason Street, Santa Barbara, CA
- 309 W Ortega Street, Santa Barbara, CA
- 311/313 W Ortega Street, Santa Barbara, CA
- Chapala Street Pony Truss Bridge
- Mission Creek Diversion

The COE has also determined that the Lower Mission Creek Flood Control Project will have no adverse effect on historic properties. Based on review of the submitted documentation, I concur with the foregoing determinations.

Thank you for considering historic properties during project planning. If you have any questions, please contact Natalie Lindquist of my staff at (916) 654-0631 or e-mail at nlind@ohp.parks.ca.gov.

Sincerely,

M Greenberg for

Daniel Abeyta, Acting
State Historic Preservation Officer

STATE OF CALIFORNIA – THE RESOURCES AGENCY

GRAY DAVIS, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
O. BOX 942896
CRAMENTO, CA 94296-0001
916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov

January 27, 2000

Reply To: COE000106A

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 832711
Los Angeles, CA 90053-2325

Re: Lower Mission Creek Flood Control Study, Santa Barbara, CA

Dear Mr. Koplin:

Thank you for requesting my comments, pursuant to 36 CFR §800.3(c)(3), about the undertaking cited above. The proposed project includes the demolition and replacement of seven non-historic bridges, demolition and reconstruction of the Chapala Street Bridge, removal of two houses, and partial removal of the sandstone Mission Creek Diversion. The next step for the Corps of Engineers (COE) will be to initiate Section 106 consultation for this undertaking. I look forward to working with the COE in the future regarding this project.

Thank you for considering historic properties during project planning. If you have any questions, please contact Natalie Lindquist of my staff at (916) 654-0631 or e-mail at nlind@ohp.parks.ca.gov.

Sincerely,

Daniel Abeyta, Acting
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

June 21, 2000

Office of the Chief
Environmental Resources Branch

Mr. Peter Douglas
Executive Director
California Coastal Commission
Attn: Mr. Jim Raives
45 Fremont, Suite 2000
San Francisco, California 94105

Dear Mr. Douglas:

The U.S. Army Corps of Engineers (USACOE) submitted its Coastal Consistency Determination (CCD) for the Lower Mission Creek Flood Control Project, Santa Barbara, California, for your review and consideration in December 1999 with the Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR).

Since the submittal of the CCD, the USACOE has continuously and informally coordinated the proposed project with Mr. James Raives of your staff. Mr. Raives expressed several concerns for impacting environmental resources with implementation of the proposed project. The concerns include: visual resources; impacts to listed species (steelhead and tidewater gobies); estuarine habitat; mitigation for impacts to listed species, aquatic habitat, and existing vegetation; water quality; sand supply, and cultural resources. Mr. Raives requested additional information to facilitate preparation of a staff report and recommendation on Consistency Determination, (Consistency Determination No. CD-117-99).

The project design has been modified since the submittal of the CCD. By request of your office and other concerned resource agencies, the U.S. National Marine Fisheries Service (USNMFS) and U.S. Fish and Wildlife Service (USFWS) the Corps has performed additional analysis for hydrology of the stream with the project and without the project, providing detailed mitigation monitoring plan for the planted vegetation and significant resources located within the project area. The USACOE has revised biological assessments for tidewater gobies and steelhead to incorporate revised project related information. The USACOE has submitted revised BA to both agencies, the USFWS and USNMF. The Corps is including supporting documents: Mitigation Monitoring Plan, Biological Assessment for tidewater gobies; Revised Project Description; Hydraulics/Engineering analysis; Biological Assessment for Steelhead (*Oncohrynchus mykiss*), the project plans; and supporting plans and drawings. The Biological Opinion for tidewater gobies and steelhead would be provided to your office as soon as we received them from the USNMFS and USFWS.

The Corps requests your office to expedite the review process of the CCD and desires to obtain your concurrence with the CCD by August 2000 public hearing, in order to meet the critical timeframe for submittal of the Feasibility Report and the Final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Water Resources Development Act (WRDA) of 2000. The EIS/EIR should include biological opinion from your office and the U.S Fish and Wildlife Service (USFWS), and the California Coastal Commission's concurrence with the Coastal Consistency Determination (CCD) for the proposed project.

The WRDA is the legislation through which Congress authorizes the Secretary of the Army to construct various projects for improvements to rivers and harbors of the United States, and for other purposes. It is critical for the City and the County of Santa Barbara and the residents of the Mission Creek Floodplain that the Corps obtain approval for the construction of this project as soon as possible. The last date that the Los Angeles District can submit documents identified in the above paragraph for inclusion in WRDA 2000 is August 31. If we miss this submittal date, the project authorization could be delayed until year 2002 or beyond.

Your timely concurrence with our CCD submitted in December 1999 would be greatly appreciated to allow project construction to commence on the scheduled date. If you have any questions regarding this project please contact Ms. Joy Jaiswal Environmental Coordinator at (213) 452-3871, or Dr. John Moeur project biologist at (213) 452-3874.

Thank you for your time and attention to this request.

Sincerely,

Robert E. Koplin, P.E
Chief, Planning Division

Enclosures

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

December 20, 1999

Office of the Chief
Environmental Resources Branch

Mr. Peter Douglas
Executive Director
California Coastal Commission
Attn: Mr. Jim Raives
45 Fremont, Suite 2000
San Francisco, California 94105

Dear Mr. Douglas:

The U.S. Army Corps of Engineers (USACOE), submits this Coastal Consistency Determination (CCD) for the Lower Mission Creek Flood Control Project, Santa Barbara, California for your review and consideration. The USACOE has initiated coordination with Mr. Jim Raives of your staff to determine the need for a CCD. A copy of the Draft Feasibility Report and Draft Environmental Impact Statement/Environmental Impact Report is also provided for detailed analysis for each environmental resources.

The study is limited to the final 1.2 miles of the creek, between Canon Perdido Street and Cabrillo Boulevard This study does not extend to the lagoon. The proposed project would provide 3400 cubic feet per second (cfs) of capacity and approximately a 20-year level of flood protection. A project description is provided in enclosure 1 of the CCD. Environmental commitments or mitigation measures have been developed for each environmental resource to avoid or minimize project related impacts (enclosure 2). Information for the biological resources can be found in the HEP analysis report, Biological Assessment and USFWS's Coordination Act Report (enclosure 3, 4 and 5).

Your timely concurrence of this CCD would be greatly appreciated to allow project construction to commence on the scheduled date. If you have any questions regarding this project please contact Ms. Joy Jaiswal, Environmental Coordinator at (213) 452-3871, or Dr. John Moeur, project biologist at (213) 452-3874.

Thank you for your time and attention to this request.

Sincerely,

Robert E. Koplin, P.E
Chief, Planning Division

Enclosures

Jen

ENVIRONMENTAL DEFENSE CENTER

RECEIVED
AUG 10 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

August 9, 2000

Pat Kelly
City of Santa Barbara
Public Works Department
630 Garden Street
Santa Barbara, CA 93101

RE: LOWER MISSION CREEK SHADE ANALYSIS, FEBRUARY 25, 2000

Dear Pat,

The Environmental Defense Center (EDC) has reviewed the Lower Mission Creek Shade Analysis performed by Penfield and Smith and submitted to you under a February 25, 2000 cover letter. This letter represents EDC's comments in response to the shade analysis.

The Analysis Assumes Trees will be Planted by the Community

In its first sentence, the February 25, 2000 letter to you states that "this analysis was performed in response to questions regarding how much of the water in Lower Mission Creek would be shaded after completion of the project proposed by the Army Corps of Engineers." However the letter also states, on page 2, that the analysis "assumes that some sycamore and willow trees will be planted by the community adjacent to the creek bank on private property." This assumption renders the analysis flawed because "the project" undergoing environmental review does not include the planting of trees by "the community" or by anyone else along any of the banks where only vertical walls will be installed (e.g., no sloped vegetated bank).

Throughout the lengthy project reach, 35% of the banks will be vertical walls with no vegetated side slopes and no trees or shrubs planted on top of the vertical walls. This percentage of unvegetated banks is at least twice as high for the section of the project below Highway 101, where vertical walls with no trees will dominate the creek corridor. Since the analysis assumes planting of the extensive reaches of creek bank, particularly south of Highway 101 and along the lagoon that will not be planted as part of this project, the analysis only misrepresents the project impacts relating to water, biological and aesthetic resources.

The analysis should be redone with no dangerous assumptions about what "the community" may plant on "private property" in speculative future efforts distinct from the project.

The Analysis Assumes Extremely High Tree Growth Rates

The model also assumes very rapid plant growth. Sycamore trees are assumed to reach heights of 20 to 30 feet after 5 to 10 years. The analysis does not account for the fact the trees are proposed to be of local stock and origin that are typically not available in large container sizes. Even if 5-gallon and 10-gallon trees were available to plant, expecting them to reach heights of 20 to 30 feet in 5 to 10 years is unrealistic. Based on my extensive experience conducting and managing habitat restoration efforts along local creeks and reviewing and

906 GARDEN ST, SANTA BARBARA, CA 93101 • (805) 963-1622 FAX: (805) 962-3152 E-MAIL: edc@rain.org
31 N. OAK ST, VENTURA, CA 93001 • (805) 643-6147 FAX: (805) 643-6148 E-MAIL: edcvent@west.net

monitoring private creek restoration/mitigation plantings, I believe that sycamore trees should be expected to reach heights of 10 to 15 feet in 5 to 10 years. This is consistent with the growth rate of sycamores planted and irrigated along Mission Creek near State and Alamar, and consistent with the growth rates of other sycamores planted and maintained for creek restoration projects, including the San Jose Creek Restoration Project, on the south coast.

On the other hand, the expected growth rates of willow trees used in this model is consistent with the observed growth rates of willow trees planted and maintained as part of local creek revegetation projects.

The Analysis Ignores Limiting Effect of Inverted T-Foundation on Root Growth

Another factor that EDC considers to be a potential restriction on the growth rates of the sycamores and willows are the inverted T-foundations proposed for much of the project length where vertical walls are to be used. These foundational footings will restrict root growth and will hinder the ability of roots to grow into and below the channel bed to access water, particularly after irrigation ceases. The Corps has indicated that holes on the T-footings of the proposed walls could only be spaced every 40 feet to ensure structural integrity, and that is why it initially proposed planting sycamore trees every 40 feet. The physical constraints imposed by the inverted T-foundations will reduce the rate of tree growth compared to trees on banks that do not have physical barriers obstructing the root growth.

Conclusion

In closing, the authors of the analysis "cautioned" the reader to "remember that this shade analysis software probably only provides a general qualitative perspective." The shade analysis performed by Penfield and Smith represents a best case scenario for plant growth. The EIR/EIS will have to address the reasonable worst case scenario. The analysis assumes that the community will plant trees along the 35% of the project reach that, as proposed, will consist of vertical walls with no planted slopes. This assumed planting, however, is not part of the project description or mitigation measures, and therefore cannot be relied upon to conclude that the project will increase shading. Plant growth rates used for the analysis are unrealistically high given experiences with other creek revegetation projects in this region, and do not account for the restrictions imposed by the walls' foundations. This analysis does not confirm that shading along the project reach will be increased, and leaves the concern not addressed. The analysis should be conducted again utilizing reasonable worst-case scenario growth rates as required by CEQA to analyze only project-related activities.

Thank you for your attention to these comments.

Sincerely,

Brian Trautwein

Brian Trautwein
Environmental Analyst

cc: Jan Hubbell, City of Santa Barbara Community Development Department
John Mour, U.S. Army Corps of Enginers

August 9, 2000

Pat Kelly
City of Santa Barbara
Public Works Department
630 Garden Street
Santa Barbara, CA 93101

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Thank you for your attention to these comments.

Sincerely,

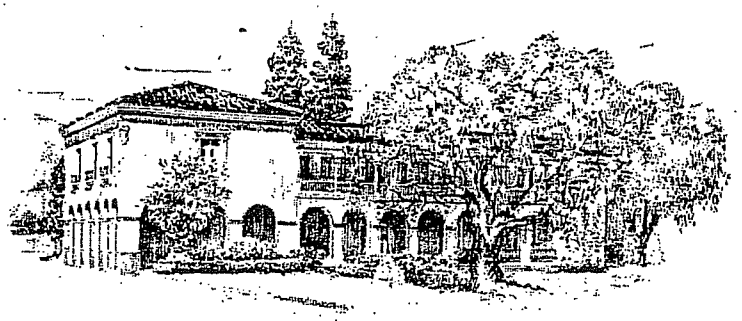
Brian Trautwein

Brian Trautwein
Environmental Analyst

cc: Jan Hubbell, City of Santa Barbara Community Development Department
John Mour, U.S. Army Corps of Enginers

CITY OF SANTA BARBARA

3LIC WORKS DEPARTMENT
Telephone: (805) 564-5377
Fax: (805) 564-5467
www.ci.santa-barbara.ca.us



630 Garden Street
P.O. Box 1990
Santa Barbara, CA 93102-1990

August 21, 2000

Mr. Brian Trautwein
Environmental Defense Council
906 Garden Street
Santa Barbara, CA 93101

SUBJECT: LOWER MISSION CREEK – SHADE ANALYSIS

Dear Mr. Trautwein:

Thank you for your comments regarding a shade analysis that we did for the project. The analysis was initiated in response to a request from our project design review subcommittee. The subcommittee included members of Historical Landsmarks Commission, Architectural Board of Review, Planning Commission and City staff. The committee was very helpful in helping to add environmental, community, aesthetic, etc. elements, into the project description.

You may recall the idea of coordinating the landscaping effort for the project with the adjacent private property owners. This was recommended in a letter from the South Coast Watershed Alliance. We all think this is a good idea.

The idea is to plant riparian trees and other riparian vegetation on private property behind the project right-of-way that could grow to provide additional shade to the creek as part of a community planting project. Since this type of effort is beyond what a Corps sponsored federal project typically includes, City staff is currently planning to include this effort as originally proposed, as a community program. The City would arrange for community groups to coordinate this effort. So, even though the proposed landscaping behind the project right-of-way is currently not part of the Corps project, City staff is committed to make it happen. Efforts have already been initiated toward this. It is expected that when the project is completed, many adjacent property owners will have taken advantage of this community program.

I agree that the study is not absolutely accurate. It does not include the presence of existing trees or buildings that currently provide shade to lower Mission Creek. It also assumes there will be trees planted behind the project right-of-way as part of the proposed community landscaping program that may not actually get planted where assumed. I would not characterize this as a "dangerous assumption" as you noted in your August 9, 2000 letter. The analysis is simply, as noted by Penfield & Smith Engineers, "a generally qualitative perspective". It was not intended to be portrayed as anything more. We looked at doing a more quantitative analysis and found it to be cost prohibitive. The added cost for another analysis that probably still would not be absolutely accurate, was not deemed reasonable. As I said earlier, there are some existing elements that provide shade that are not included in the analysis, and there may be some elements as you argue in your letter that are over optimistic.

As I've noted earlier, we are interested in your concerns. We have initiated many other studies to analyze these concerns. The studies to date continue to find that the project description is sufficient to answer what I understand to be the concerns.

If you have any questions, please do not hesitate to contact me at 564-5366.

Yours very truly,

Pat Kelly
Assistant Public Works Director/City Engineer

PK/apm

cc: Jan Hubbell, Project Planner
John Moeur, U.S. Army Corps of Engineers, Los Angeles District, Planning Division, 911 Wilshire Boulevard, Los Angeles, CA 90017-3401
Bruce Burnworth, Penfield & Smith, Engineers Inc., 111 East Victoria Street, P.O. Box 98, Santa Barbara, CA 93102
Sharyn Main, South Coast Watershed Alliance, c/o Wendy P. McCaw Foundation, P.O. Box 22458, Santa Barbara, CA 93121

bcc: Mr. Tom Fayram, Santa Barbara County Flood Control District, 123 East Anapamu Street, Santa Barbara, CA 93101

CITY OF SANTA BARBARA

. .BLIC WORKS DEPARTMENT
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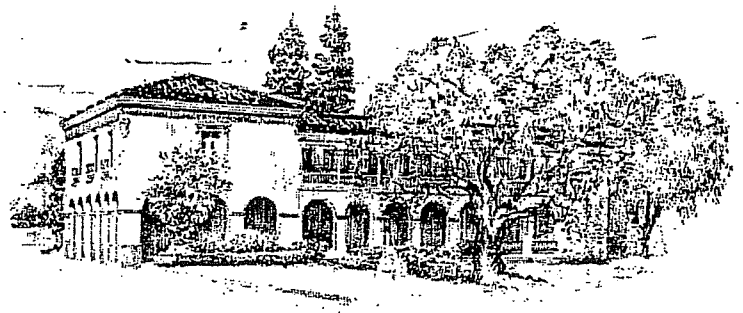

630 Garden Street
P.O. Box 1990
Santa Barbara, CA 93102-1990

August 21, 2000

Mr. Brian Trautwein
Environmental Defense Council
906 Garden Street
Santa Barbara, CA 93101

SUBJECT: LOWER MISSION CREEK – SHADE ANALYSIS

Dear Mr. Trautwein:

Thank you for your comments regarding a shade analysis that we did for the project. The analysis was initiated in response to a request from our project design review subcommittee. The subcommittee included members of Historical Landsmarks Commission, Architectural Board of Review, Planning Commission and City staff. The committee was very helpful in helping to add environmental, community, aesthetic, etc. elements, into the project description.

You may recall the idea of coordinating the landscaping effort for the project with the adjacent private property owners. This was recommended in a letter from the South Coast Watershed Alliance. We all think this is a good idea.

The idea is to plant riparian trees and other riparian vegetation on private property behind the project right-of-way that could grow to provide additional shade to the creek as part of a community planting project. Since this type of effort is beyond what a Corps sponsored federal project typically includes, City staff is currently planning to include this effort as originally proposed, as a community program. The City would arrange for community groups to coordinate this effort. So, even though the proposed landscaping behind the project right-of-way is currently not part of the Corps project, City staff is committed to make it happen. Efforts have already been initiated toward this. It is expected that when the project is completed, many adjacent property owners will have taken advantage of this community program.

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If you have any questions, please do not hesitate to contact me at 564-5366.

Yours very truly,

Pat Kelly
Assistant Public Works Director/City Engineer

PK/apm

cc: Jan Hubbell, Project Planner
John Moeur, U.S. Army Corps of Engineers, Los Angeles District, Planning Division, 911 Wilshire Boulevard, Los Angeles, CA 90017-3401
Bruce Burnworth, Penfield & Smith, Engineers Inc., 111 East Victoria Street, P.O. Box 98, Santa Barbara, CA 93102
Sharyn Main, South Coast Watershed Alliance, c/o Wendy P. McCaw Foundation, P.O. Box 22458, Santa Barbara, CA 93121

bcc: Mr. Tom Fayram, Santa Barbara County Flood Control District, 123 East Anapamu Street, Santa Barbara, CA 93101

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APR 03 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

March 28, 2000

Jan Hubbell
City of Santa Barbara
Community Development
630 Garden Street
Santa Barbara, CA 93101

RE: LOWER MISSION CREEK FLOOD CONTROL PROJECT FEASIBILITY STUDY AND DRAFT EIR/EIS; SIGNIFICANT NEW INFORMATION REGARDING SIGNIFICANT NEW BIOLOGICAL IMPACT

Dear Jan:

The Environmental Defense Center (EDC) is a non-profit environmental law firm working to promote sustainable land uses, resource protection, and habitat restoration. As you are aware, EDC submitted extensive comments regarding the draft EIR/EIS for the Lower Mission Creek Flood Control Project in the form of a letter dated February 10, 2000. We appreciate the opportunity to comment on the project, its impacts, and the environmental review document, and are submitting significant new information regarding the project's potential impacts to steelhead that was not and could not have been known during or prior to the comment period for the draft EIR / EIS.

The presence of ocean-run steelhead in Lower Mission Creek this year has been documented and celebrated by creek neighbors, creek watchdogs, and the media. While the presence of steelhead in the creek is not new information (two were documented by the Department of Fish and Game in 1998 at 410 West Islay Street and others have been documented throughout recent history,) steelhead spawning in Lower Mission Creek had not been previously recorded. In Mid-March of this year, steelhead ranging up to 27 inches in length were videotaped and photographed spawning in Lower Mission Creek, adjacent to the 700 block of Bath Street. In addition, several redds (steelhead nests) were identified in the creek adjacent to both the 700 and 800 blocks of Bath Street. The attached Santa Barbara News Press photograph and article dated March 15, 2000 verify the newly documented spawning activity.

The draft EIR/EIS recognizes that steelhead utilize Lower Mission Creek. However, the document only recognizes the value of Lower Mission Creek as a migratory corridor for steelhead, and does not recognize its value as spawning habitat. The EIR states that steelhead would only be in the lower reaches of the creek during migration between December 15 and March. EDC comments submitted on February 10, 2000 counter this by explaining that steelhead are found lower reaches of the creek during other times of the year. However, the lower portion of the creek has never been viewed as spawning habitat by the EDC, in the draft EIR/EIS, or by other experts. In light of the significant new information that steelhead spawn in Lower Mission Creek, this viewpoint must be reexamined and changed.

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31 N. OAK ST, VENTURA, CA 93001 • (805) 643-6147 FAX: (805) 643-6148 E-MAIL: edcvent@west.net

The draft EIR/EIS recognizes the presence of steelhead in the creek, but does not account for spawning activity that can and that does occur in the project reach, and thus the draft EIR/EIS does not analyze the impacts of the project on spawning. For this reason, based on this new information, the draft EIR/EIS must be made to address this new information and the related new significant impacts raised by it.

The fact that spawning occurs in the lower reaches of the creek, coupled with anticipated significant impacts to the streambed and aquatic habitat, means that the project will have new significant impacts not addressed by the draft EIR/EIS or by EDC's comments or other public or agency comments. Some of the same project impacts to steelhead over-summering pools in Lower Mission Creek identified by EDC also apply to steelhead spawning areas. In addition to the impacts identified by EDC in our previous letter, the proposed project will also:

- Increase thermal pollution temporarily or permanently as a result of creek widening and tree removal. Warmer water renders steelhead less able to conduct spawning activities, and reduces steelhead hatchling survival rates.

- Increase sedimentation as a result of reduced runoff velocities (caused by a wider channel.) This will reduce the percentage of gravel relative to fine sediments in substrate materials at steelhead spawning locations. Reduced percentages of gravel relative to fines in the creek bed equates to reduced size and number of potential spawning areas, degradation of spawning areas, potential abandonment of spawning areas, and reduced survival of steelhead eggs and frye.

- Increase maintenance levels including desilting associated with the increased sedimentation. As documented in the draft EIR/EIS and commented on previously by EDC, increased sedimentation and desilting will further degrade steelhead spawning areas and spawning activities by disturbing stream bed sediments, pools and riffles.

- Increase the use of herbicides including glyphosates to keep the channel bed cleaner of vegetation than it is currently kept. Glyphosates in herbicides and/or surfactants applied with typically used herbicides in local creeks are toxic to steelhead, and would adversely impact spawning and hatchling and frye survival. Information regarding the toxicity of glyphosates to salmonids was presented in our previous submittal.

- Widen the creek, inducing increased sedimentation. This will have the effect of reducing pool/riffle formation and it may change or eliminate the very pools in which the redds and spawning steelhead were found in this year. Steelhead require a certain stream geomorphology to establish successful redds and to successfully reproduce. The project will change the creek bed geomorphology due to construction and maintenance and will result in conditions less conducive to spawning than exist currently.

Steelhead spawn in Lower Mission Creek, and steelhead of all life stages can be present in Lower Mission Creek year round. The draft EIR/EIS failed to accurately analyze the impacts to steelhead from widening and maintenance, and specifically failed to consider or analyze the impacts to steelhead spawning in Lower Mission Creek. Prior to March of this year, it was not known, and could not have reasonably been known, that steelhead spawn in Lower Mission Creek. Now that this new information is available, the project's environmental review must address it. Based on EDC's analysis of the impacts to steelhead spawning and reproduction, we feel that there is evidence in the record and grounds to find that the project will result in a new significant biological impact.

Even the draft EIR/EIS' HEP determined that the habitat utilized by steelhead, the streambed will be seriously degraded as a result of the project. The streambed habitat value will drop from .8 habitat units to .3 habitat units. This degradation of the creek bed habitat associated with widening and maintaining the channel more free of vegetation will significantly impact steelhead, but significant impacts to steelhead were not identified in the draft EIR/EIS. Now that the area is known as spawning habitat for steelhead, the planned degradation of the streambed and aquatic habitat values by more than half must be considered a significant impact to steelhead, an endangered species.

In closing, the project, as proposed, would further reduce the numbers of southern steelhead which have already declined by an estimated 99% over historic population levels. This is a new, significant impact, based on new information. Impacts to steelhead spawning must be addressed through this environmental review process. EDC looks forward to working with the City, the County and the Corps in the modification of the project to reduce or eliminate significant impacts to endangered resources.

Thank you for your attention to our comments.

Sincerely,

Brian Trautwein,
Environmental Analyst

cc: Santa Barbara County Board of Supervisors
Santa Barbara County Flood Control District
Santa Barbara County Planning and Development Department
Santa Barbara City Council
Santa Barbara City Engineer
California Coastal Commission
California Department of Fish and Game
California Regional Water Quality Control Board
US Fish and Wildlife Service
National Marine Fisheries Service
Congresswoman Lois Capps
Waterways Restoration Institute

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ax Number 564-5477

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SANTA BARBARA, CA 93102-1990

February 22, 2000

Mr. James Raives
California Coastal Commission
45 Fremont St., Suite 2000
San Francisco, CA 94105-2219

SUBJECT: Lower Mission Creek Flood Control Project, Coastal Consistency Determination (CD-117-99)

Dear Mr. Raives:

We have reviewed the memorandum you wrote to John Moeur at the U.S. Army Corps of Engineers (Corps) and the Draft Staff Report and Recommendation on the above-stated project. We understand that the Corps will be responding to most of the issues you have raised. However, the City of Santa Barbara has additional comments as well. These comments primarily focus on the vertical walls between Yanonali and State Streets and on water quality issues.

Replacement of Vertical Walls Between Yanonali and State Streets

Coastal Commission staff has raised the question of why the U.S. Army Corps of Engineers is not proposing to do either a short vertical wall with vegetated riprap slope above or a full vegetated riprap bank below the Freeway. There are several reasons why this is not being pursued. Alternative 12 (the Preferred Alternative) is projected to cost approximately $18 million (this includes revisions to reflect the gross appraisal of acquisition costs prepared for the City and changes to the project design to reduce land acquisition costs). Alternative 9, which includes the low vertical toe wall and vegetated riprap above and is the alternative that most closely complies with the California Coastal Commission's request, is even more expensive. For additional information regarding how the Corps calculated real estate costs, as well as additional information on the hydrologic models, we have included a copy of the Technical Appendices for the Main Report (Exhibit 1). There are also additional costs that were not considered in the Corps estimation of costs. These are outlined in more detail below.

Additional Property Acquisition Costs

In order to include short vertical walls and a vegetated riprap slope and keep the proposed 3400 cfs capacity, it would be necessary to widen the channel at the top of the bank by 20 feet. If the channel is designed with a full vegetated riprap slope, it would be necessary to widen the channel at the top of the bank by 32 feet. This would result in the need to demolish or relocate several buildings not considered for demolition as part of Alternative 12. These buildings are outlined in Exhibit 2 (attached). Land acquisition and relocation costs would increase from approximately $4.1 million to $8.1 million, increasing the project cost to at least $22 million. It should be noted that the Corps estimates for acquisition for this area are substantially less than the $4 million estimated by the independent appraisal performed as part of the required gross appraisal.

Required Replacement of Low and Moderate Income Housing in the Coastal Zone

There are nine (9) units contained in the buildings that would be affected by constructing Alternative 9. At least some of the units affected may be housing inhabited by low/moderate income residents. If this is the case, in addition to the standard relocation costs included above, it may be necessary to meet the provisions of California Government Code Article 10.7, Low- and Moderate-Income Housing Within the Coastal Zone, Section 65590, which states, in subsection (b):

> *"(b) The conversion or demolition of existing residential dwelling units occupied by persons and families of low or moderate income, as defined in Section 50093 of the Health and Safety Code, shall not be authorized unless provision has been made for the replacement of those dwelling units with units for persons and families of low or moderate income. Replacement dwelling units shall be located within the same city or county as the dwelling units to be demolished. The replacement units shall be located on the site of the converted or demolished structure or elsewhere within the coastal zone if feasible, or, if location on the site or elsewhere within the coastal zone is not feasible, they shall be located within three miles of the coastal zone. The replacement dwelling units shall be provided and available for use within three years from the date upon which work commenced on the conversion or demolition of the residential dwelling unit. In the event that an existing residential dwelling unit is occupied by more than one person or family, the provisions of this subdivision shall apply if at least one such person or family, excluding any dependents thereof, is of low or moderate income. ...*
>
> *"The requirements of this subdivision for replacement dwelling units shall not apply to the following types of conversion or demolition unless the local government determines that replacement of all or any portion of the converted or demolished dwelling units is feasible, in which event replacement dwellings shall be required:*

> *"(1) The conversion or demolition of a residential structure which contains less than three dwelling units, or, in the event that a proposed conversion or demolition involves more than one residential structure, the conversion or demolition of 10 or fewer dwelling units.*
>
> *"(2) The conversion or demolition of a residential structure for purposes of a nonresidential use which is either "coastal dependent," as defined in Section 30101 of the Public Resources Code, or "coastal related," as defined in Section 30101.3 of the Public Resources Code. ...*
>
> *"(3) The conversion or demolition of a residential structure located within the jurisdiction of a local government which has within the area encompassing the coastal zone, and three miles inland therefrom, less than 50 acres, in aggregate, of land which is vacant, privately owned and available for residential use.*
>
> *"(4) The conversion or demolition of a residential structure located within the jurisdiction of a local government which has established a procedure under which an applicant for conversion or demolition will pay an in-lieu fee into a program, the various provisions of which, in aggregate, will result in the replacement of the number of dwelling units which would otherwise have been required under this subdivision."*

Replacement of lost low/moderate income housing in the Coastal Zone or anywhere in the City of Santa Barbara is extremely expensive, given the value of land in the Santa Barbara area (much less the Coastal Zone itself). The median cost of a single family home on the South Coast of Santa Barbara County was recently reported at $475,000, well above affordability for most people. Condominiums in the area are priced in the mid $250,000 range and above. Two-bedroom units currently rent at $1200 per month and above. It would require a subsidy of approximately $100,000 per unit to construct additional housing as required by Government Code Section 65590.

Use of Redevelopment Agency Funds

Commentors have suggested that City Redevelopment Agency funds could be used to provide for an alternative that includes the low vertical walls with vegetated side slope or a full vegetated riprap bank. The Community Redevelopment Law (Health and Safety Code §33000 et seq.) limits project purposes for which redevelopment funds may be used. Case law has indicated that unless such purposes are stated specifically in the Community Redevelopment Law, funds should generally not be used for such purposes. Capital recreation projects intended to foster private redevelopment of physically and economically blighted areas might be considered. However, payment for flood control facilities is not included in the list of projects. Redevelopment funding can be used to improve project aesthetics or to provide for needed recreation. However, as

indicated above, the additional funds required to purchase property to allow vegetated banks would be approximately $4 million. The City Redevelopment Agency has agreed to set aside $2.5 million to be used for project enhancements or betterments, provided that such enhancements are consistent with and foster the statutory objectives of Redevelopment law. This is not enough to buy the necessary property. In the Waterfront Area, south of U.S. 101, there are already significant recreation and park facilities, so the primary recreation focus has been on providing small passive park areas and/or "tot lots" north of the freeway, in the West Downtown area, where there are no park spaces and the residential density is much higher. Redevelopment funds would also be used to improve the appearance of the bridges to be replaced to make sure that they continue to fit the small-scale, semi-residential character of their neighborhoods. Redevelopment funds would be used to expand the number of trees and other plants used in the project reach and in the habitat expansion areas, in order to assure as much of a canopy and understory as possible. Finally, redevelopment funds would be used to provide interpretive signs that would enhance the creek experience and promote public education on creek systems.

Cost of Mitigation for Lost Historic Resources

The City is very concerned about the potential loss of significant historic resources as a result of the project. All of the buildings west of Mission Creek on Chapala and Mason Streets in the Waterfront Area are eligible for listing on the National Register of Historic Places, the California Register of Historic Resources and for designation as either a City Landmark or City Structure of Merit. The 100 Block of Chapala Street also appears to be eligible for designation as a National Register Landmark District. There is no acceptable mitigation for the loss of these structures, which would be significant and unavoidable. Even partial mitigation, which would include full Historic American Buildings Survey documentation, at a minimum, would be costly. It is estimated that documentation of the four historic buildings on the west side of the creek would cost approximately $6,000. The best partial mitigation would be to try to relocate the structures to other parcels, which would be even more expensive than standard residential or business relocation costs, because of the need to both purchase a parcel on which to place the building and to actually move the building itself. At least one of the buildings may not be physically able to be relocated due to the type of construction involved. Costs could be expected to exceed $1 million.

Aesthetics

The appearance of the vertical walls is another issue in this section of the creek. A Mission Creek Design Subcommittee was formed in 1999 and has met regularly for the last several months. The Subcommittee includes representatives from the City's Historic Landmarks Commission (which has design jurisdiction over most of the creek south of U.S. 101), the Architectural Board of Review (which has design review jurisdiction where the Historic Landmarks Commission does not), the Planning Commission and the Parks and Recreation Commission. The concept of vegetated side slopes with short vertical toe walls was developed

with the assistance of the Design Subcommittee, based on the Alternative supported by the original Mission Creek Consensus Group. This alternative includes vertical walls where necessary to minimize impacts on historic structures and avoid prohibitively expensive acquisition of property, housing and businesses. The Design Subcommittee also made recommendations regarding various aesthetic improvements to the Corps project. The City forwarded these recommendations to the Corps and the Corps has agreed to incorporate these design changes into the project (see Exhibit 3 – 5 sheets showing the project reach by reach and Exhibit 4 – several pages showing design details). These drawings show that the concrete walls would be formed, textured and colored to resemble the sandstone walls so prevalent in Santa Barbara.

The preferred project (Alternative 12 plus the City and County preferred design changes) replaces significant sections of existing full height hard bank protection with vegetated side slopes with short toe walls. This approach is most feasible above the freeway where property costs are substantially less than in the areas below the freeway and development adjacent to the creek is somewhat less dense. However, as discussed below, there are two small habitat expansion zones in this area.

Habitat Expansion Zone Areas

While it may not be feasible to provide non-vertical walls for the entire project area south of Yanonali Street, it should be noted that there are two habitat expansion zones included in this area. Both are on the easterly side of the creek. One is between the creek and Kimberly Avenue, north of Mason Street. The second is immediately south of Mason Street. There are several ways to design these Habitat Expansion Zones. They can be designed so that there is vegetated riprap for the entire area. This would create locations for Tidewater gobies to hide in vegetation during high flows. It may also be feasible to redesign the area between State Street and Cabrillo Boulevard, which is proposed to have a low toe wall and vegetated riprap, to allow for more vegetation closer to the creek bottom.

Summary

For all of these reasons, including increased project costs, effects on housing and loss of cultural resources, we do not believe that it is feasible to redesign the project below U.S. 101 to include either low vertical walls with vegetated riprap side slopes or full vegetated riprap banks in the final design. We would further point out that the wider creek cross-section might also be more difficult to shade than the present vertical wall design. However, as indicated above, we believe that it may be possible to design both the habitat expansion zones in this area and the section between State Street and Cabrillo Boulevard to provide better habitat for the Tidewater goby.

Water Quality

Background

Mission Creek water quality was studied as part of the South Coast Watershed Characterization Study and reported on in the Study's final report dated August 1999 (Exhibit 5). This study was undertaken to investigate four Santa Barbara County South Coast streams in reaction to the coming mandate to develop a National Pollution Discharge Elimination System (NPDES) work plan under Phase II of the NPDES regulations. The study concluded that the major contamination problem for South Coast streams is bacteriological contamination. Specifically regarding Mission Creek, the study concluded:

- Bacteria are the principal pollutants of concern
- Much of the uppermost watershed has acceptable levels of bacteria
- Storm drains and creek encampments are probable sources of high levels of bacteria in the middle portions of the watershed
- Storm drains and lagoon fauna, such as birds, are probable sources of high levels of bacteria in the lower watershed
- No direct link between septic system and beach closures has yet been established
- Stormwater carries several times the low flow levels of bacteria

Concurrent and subsequent investigations by the City have identified the existence of encampments in the lower watershed as one primary cause of high bacteria levels. In addition, Old Mission Creek, the abandoned former channel of Mission Creek prior to channel relocation of the middle reach of Mission Creek, is also a significant contributor to elevated bacteria levels downstream of its connection to the current main channel of Mission Creek.

Current Activities

The City and County of Santa Barbara are cooperatively continuing efforts to clean up local creeks. The reaches of Mission Creek with high bacteria levels are within the boundaries of the City of Santa Barbara, so efforts in this creek are largely those of the City. The cooperative public education and information program, however, is a joint effort that is key to gaining public acceptance of the many activities and improvements that will be needed to improve creek water quality in Mission Creek and other South Coast creeks.

The City's efforts in Mission Creek include a variety of activities directed toward improving creek water quality. This group of activities is called the Creek Water Quality Improvement Project. The Creeks Strategic Plan Program is also investigating Creek restoration. Both of these approaches should result in improvements to the water quality in the City's creeks.

The Creek Water Quality Improvement Project includes the elements of a work plan required by Phase II of the NPDES stormwater management program. Activities include:

- Monitoring of creek water quality, including increased investigation of "hot spots"
- Increased enforcement of City ordinances related to prohibition of discharges of contaminated water
- Public information and education
- Municipal government good housekeeping
- Increased cleanups of catch basins and creeks
- Removal of illegal encampments within creek corridors
- Enhanced street sweeping

The City is also investigating the possibility of a pilot project for installation of one or more stormwater interceptors for storm drains that flow into lower Mission Creek.

The Creek Strategic Plan Program is doing a creeks inventory to determine restoration possibilities in City creeks, investigating revising City policies that are related to creek water quality and overall enhancement, and implementing a small number of opportunity restoration projects within City creeks. The creeks inventory is expected to present a larger list of restoration opportunities within City creeks. The opportunity projects of most interest for Mission Creek are enhancements to the Lower Mission Creek Flood Control Project and restoration of habitat and environmental education in a park along Old Mission Creek.

Future Activity in Mission Creek

The investigations underway indicate that lower Mission Creek has poor bacteriological water quality because it receives surface runoff from the City's commercial areas, has homeless encampments, and is the recipient of trash from a number of sources including neighboring residential areas and bridges. Old Mission Creek, which has elevated bacteria counts from a number of sources, provides the base flow for lower Mission Creek during periods of low flow. It is considered a "hot spot" and is a target for increased investigation to determine the exact sources of contamination. Because Mission Creek is the most visible City creek and is the subject of the flood control project, City staff is focusing efforts on this creek. The focused effort includes:

- Increased monitoring within the creek to determine sources of contamination dynamics (this includes weekly creek walks to document location and extent of contamination sources)
- Stormwater interceptor pilot project
- Installation of catch basin filters in the State Street commercial area (this area drains to lower Mission Creek)
- Cleanup of Old Mission Creek hot spot(s)

The Lower Mission Creek Flood Control Project, with the approved consensus-based enhancements, is considered to be an important creek restoration element for the improvement of water quality in the creek. We expect the creek restoration and the improved flood control maintenance elements of the project to be important additions to the water quality improvement activities described above. The improved creek bottom vegetation that is part of the project enhancements will act as a biofilter for the residual contamination. Improved flood control maintenance can act as a backup or enhancement to planned cleanup efforts. All these efforts will be needed to bring the water quality of the creek to the level expected by the residents of the City of Santa Barbara.

In conclusion, we believe that concerns regarding the use of vertical walls below Yanonali Street and the improvement of water quality can be resolved. If you have any questions, please contact Pat Kelly at (805) 564-5366 or Jan Hubbell at (805) 564-5470..

Sincerely,

Pat Kelly
City Engineer/Assistant Public Works Director

Jan Hubbell
Janice M. Hubbell, AICP
Project Planner

Exhibits

1. Lower Mission Creek Flood Control Feasibility Study, Technical Appendices, December 1999
2. Estimate of Additional Right-of-Way Costs for Sloped Vegetated Side Slopes with Short Vertical Walls, State Street to Yanonali Street
3. City and County recommended Design Changes
4. City and County recommended Design Details
5. South Coast Watershed Characterization Study, August 1999, prepared by URS Greiner Woodward-Clyde for the Counties of Santa Barbara and Ventura and the Cities Santa Barbara and Carpinteria

cc: Dan Young, U.S. Army Corps of Engineers
Tom Fayram, Santa Barbara County Flood Control District

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

October 23, 1998

Ms. Joy Jaiswal
Technical Manager
U.S. Army Corps of Engineers, Los Angeles District
Environmental Design Section, CESPL-PD-RL
P.O. Box 532711
Los Angeles, CA 900 53-2325

Dear Ms. Jaiswal:

Thank you for the opportunity to comment on the notice of preparation of the draft Environmental Impact Statement/Environmental Impact Report on the Lower Mission Creek Flood Control Project. Here is a brief comment for your consideration in the Environmental Impact Statement.

Please include a complete analysis and documentation of the historical natural drainage patterns and modifications within the watershed. This would include rainfall quantities, groundwater discharges, dams, reservoirs, and imported water discharge. Through review of historic aerial photographs, land surveys, and knowledge of long time residents a record of water diversions and use can be acquired that will help provide understanding of creek drainage patterns. Many creeks and rivers have been diverted, diked, straighten, and shortened. These changes impact the their ability to effectively manage the energy of the water course. The knowledge of how creeks have functioned in the past is needed to develop an environmentally sensitive flood control project.

Should you have any questions regarding this letter, please contact me at 415/744-2013 or you can reach me by email at mcgovern.cheryl@epa.gov.

Sincerely,

Cheryl A. McGovern

Cheryl A. McGovern
Environmental Protection Specialist

SANTA BARBARA MUSEUM OF NATURAL HISTORY

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30 November 1999

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Steve Mack
Water Supply Manager
City of Santa Barbara
P.O. Box 1990
Santa Barbara, CA 93102-1990

Dear Mr. Mack:

Following El Niño rains of 1998, trout appeared in Mission Creek as it flows through the grounds of the Santa Barbara Museum of Natural History. Several of them remained here through the winter. In early summer of 1999, very young fish as well as adults were observed in pools at the Museum and up Mission Creek as far as its confluence with Rattlesnake Creek, indicating successful breeding activity at several locations. Concerned with protection of threatened species, the Museum has not publicized the existence of these fish. Nonetheless, many of our visitors have noticed them and are very eager to learn more about steelhead, why they are here, and how they fit into the riparian ecology of our area. Museum staff, their colleagues, families, friends, and other community members have also developed a strong interest in protecting these fish, which had not been seen here for many years.

There was great anxiety among all these people when it appeared that Mission Creek would go dry this summer, jeopardizing the survival of the trout. Fortunately, thanks to your quick action on being informed of the situation, these fears were not realized. Beginning in late July, you made water from the Gibraltar Reservoir - Santa Barbara Water Tunnel available for release into Mission Creek, maintaining a small but continuous flow that was enough to support many of the fish through summer and fall. The Museum community is most grateful to you for taking this action.

At present there is no assurance that similar release of city water will be possible in years to come. All of us at the Museum of Natural History hope that these remarkable fish can be assisted in their attempts produce healthy, self-sustaining populations in coastal streams. We would be pleased to work with the various agencies who oversee Mission Creek to find ways to support natural steelhead populations as part of this vital riparian ecosystem. The Museum is uniquely able to play a significant role in public education, which holds the key to the long-term survival of the southern California steelhead. Maintaining the fish that have come here to the Museum grounds is a good first step.

With deepest appreciation for your efforts,

David Anderson
Co-Executive Director

SANTA BARBARA MUSEUM OF NATURAL HISTORY
2559 Puesta del Sol Road, Santa Barbara, California, 93105-2936
805 682-4711 FAX 805 569-3757

SEA CENTER
211 Stearns Wharf, Santa Barbara, California [illegible]
805 962-0885 FAX 805 564-4815

Cc:

Mr. Rodney R. McInnis, National Marine Fisheries Service
Mr. James H. Lecky, National Marine Fisheries Service
Mr. Craig Wingert, National Marine Fisheries Service
Ms. Korie Johnson, National Marine Fisheries Service
Mr. Charles Raysbrook, Dept. of Fish and Game
Mr. Dennis McEwan, Dept. of Fish and Game
Mr. Mauricio E. Cardenas, Dept. of Fish and Game
Mr. Glen Greenwald, U.S. Fish and Wildlife Service
Mr. John Moeur, U.S. Army Corps of Engineers
Mr. Maeton Freel, U.S. Forest Service

Santa Barbara City Council
Marty Blum, Gil Garcia, Gregg Hart, Elinor Langer, Tom Roberts, Dan Secord, Mayor Harriet Miller

Santa Barbara County Board of Supervisors
Naomi Schwartz, Gail Marshall, Susan Rose, Joni Gray, Tom Urbanske

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

December 15, 1999

Office of the Chief
Environmental Resources Branch

To Interested Parties:

Enclosed for your review and comment is a copy of the Draft Feasibility Report and Draft Environmental Impact Statement/Environmental Impact Report (EIS/EIR) for the Lower Mission Creek Flood Control Project, Santa Barbara, Santa Barbara County, California. The study is limited to the final 1.2 miles of the creek, between Canon Perdido Street and Cabrillo Boulevard This study does not extend to lagoon. The proposed project would provide 3400 cubic feet per second (cfs) of capacity and approximately a 20-year level of flood protection.

The Environmental Impact Statement/Environmental Impact Report (EIS/EIR) evaluates four feasible alternatives for the environmental evaluation. They are Alternative 12, 6, 8 and No Action Alternatives (see details in the EIS/EIR Section 3). Alternative No. 12 is the National Economic Development (NED) and tentatively Recommended Plan. This alternative is also the environmentally superior plan compared to all other alternatives evaluated for the environmental analysis.

Alternative 12 consists of constructing a soft bottom creek, stabilizing the creek banks with a combination of short vertical walls along the lower banks and vegetated riprap along the upper banks, replacement of five bridges; installation of a bypass culvert, and streamlining the bedslope. This alternative provides an opportunity for construction of a wetland and habitat expansion zones. The habitat expansion zones would provide a dual benefit by expanding riparian habitat along the creek and creating passive park areas for use by area residents. Future maintenance of the constructed channel is essential to retain the form and design capacity of the creek. Impacts related to future maintenance are addressed in this document. Chapters 6 through 19 provide existing conditions and address impacts related to this proposed project. Environmental commitments and mitigation measures are included to avoid/reduce or minimize impacts to natural and cultural resources.

The U.S. Army Corps of Engineers is the Federal lead agency responsible for complying with the National Environmental Policy Act (NEPA). Santa Barbara County Flood Control District (SBCFCD) and the City of Santa Barbara are the local responsible agencies for complying with the California Environmental Quality Act (CEQA). The SBCFCD is a project proponent responsible for the future maintenance of the constructed project. This environmental document is written in compliance with NEPA, CEQA and other applicable environmental laws and regulations.

A public hearing on the Draft Feasibility Report and Draft EIS/EIR is scheduled for January 19, 2000, at 6:30 pm.; in Santa Barbara City Hall, Council Chambers; 730 Anacapa Street, Santa Barbara, California.

Should you have any comments on the proposed project, please respond within forty-five (45) days. The comment period begins December 27, 1999, and extends through February 10, 2000. Please address your comments to:

U.S. Army Corps of Engineers
Los Angeles District
ATTN: Ms. Joy Jaiswal (CESPL-PD-RL)
and
Mr. Ed Demesa (CESPL-PD-WA)
P.O. Box 532711
Los Angeles, California 90053-2325

Comments must be received by February 10, 2000. Please direct your comments to the attention of Ms. Joy Jaiswal of my staff at (213) 452-3871 or FAX (213) 452-4219. If you have questions on the Draft Feasibility Report, please contact Mr. Ed Demesa, (213) 452- 3796. Ms. Janice M. Hubbell, AICP, Project Planner is a point of contact at the City of Santa Barbara. Ms. Hubbell can be reached at (805) 564-5470. Thank you for your review of this document.

Sincerely,

Robert E. Koplin, P.E
Chief, Planning Division

Enclosure

August 9, 2000

Pat Kelly
City of Santa Barbara
Public Works Department
630 Garden Street
Santa Barbara, CA 93101

RE: LOWER MISSION CREEK SHADE ANALYSIS, FEBRUARY 25, 2000

Dear Pat,

The Environmental Defense Center (EDC) has reviewed the Lower Mission Creek Shade Analysis performed by Penfield and Smith and submitted to you under a February 25, 2000 cover letter. This letter represents EDC's comments in response to the shade analysis.

The Analysis Assumes Trees will be Planted by the Community

In its first sentence, the February 25, 2000 letter to you states that "this analysis was performed in response to questions regarding how much of the water in Lower Mission Creek would be shaded after completion of the project proposed by the Army Corps of Engineers." However the letter also states, on page 2, that the analysis "assumes that some sycamore and willow trees will be planted by the community adjacent to the creek bank on private property." This assumption renders the analysis flawed because "the project" undergoing environmental review does not include the planting of trees by "the community" or by anyone else along any of the banks where only vertical walls will be installed (e.g., no sloped vegetated bank).

Throughout the lengthy project reach, 35% of the banks will be vertical walls with no vegetated side slopes and no trees or shrubs planted on top of the vertical walls. This percentage of unvegetated banks is at least twice as high for the section of the project below Highway 101, where vertical walls with no trees will dominate the creek corridor. Since the analysis assumes planting of the extensive reaches of creek bank, particularly south of Highway 101 and along the lagoon that will not be planted as part of this project, the analysis only misrepresents the project impacts relating to water, biological and aesthetic resources.

The analysis should be redone with no dangerous assumptions about what "the community" may plant on "private property" in speculative future efforts distinct from the project.

The Analysis Assumes Extremely High Tree Growth Rates

The model also assumes very rapid plant growth. Sycamore trees are assumed to reach heights of 20 to 30 feet after 5 to 10 years. The analysis does not account for the fact the trees are proposed to be of local stock and origin that are typically not available in large container sizes. Even if 5-gallon and 10-gallon trees were available to plant, expecting them to reach heights of 20 to 30 feet in 5 to 10 years is unrealistic. Based on my extensive experience conducting and managing habitat restoration efforts along local creeks and reviewing and

906 GARDEN ST, SANTA BARBARA, CA 93101 • (805) 963-1622 FAX: (805) 962-3152 E-MAIL: edc@rain.org
31 N. OAK ST, VENTURA, CA 93001 • (805) 643-6147 FAX: (805) 643-6148 E-MAIL: edcvent@west.net

August 9, 2000

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STATE OF CALIFORNIA – THE RESOURCES AGENCY

GRAY DAVIS, *Governor*

OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
P.O. BOX 942896
ACRAMENTO, CA 94296-0001
916) 653-6624 Fax: (916) 653-9824
calshpo@ohp.parks.ca.gov

August 3, 2000

Reply To: COE000106A

Mr. Robert E. Koplin, P.E.
Chief, Planning Division
Attn: Mr. Richard Perry (CESPL-PD-RN)
U.S. Army Corps of Engineers
P.O. Box 832711
Los Angeles, CA 90053-2325

Re: Lower Mission Creek Flood Control Study, Santa Barbara, CA

Dear Mr. Koplin:

Thank you for your letters of June 27 and August 1, 2000, requesting my review and comments in regard to the Corps of Engineer's (COE) efforts to determine whether the project described above may affect historic properties. You have done this, and are consulting with me, in order to comply with Section 106 of the National Historic Preservation Act and implementing regulations codified at 36 CFR Part 800.

The COE has determined that the following properties are not eligible for the National Register of Historic Places (NRHP):

- Bridge 51C0246 – the Mission Creek Bridge between Bath and Dela Vina Street
- Bridge 51C0247 – the Mission Creek Bridge at the intersection of Dela Vina and Haley Street
- Bridge 51C0287 – the Mission Creek Bridge between Chapla and State Street
- Bridge 51C0301 – the Mission Creek Bridge between Castillo and Bath Street
- 116 Chapala Street, Santa Barbara, CA
- 134 Chapala Street, Santa Barbara, CA
- 29 State Street, Santa Barbara, CA
- 15 W Mason Street, Santa Barbara, CA
- 129 W Haley Street, Santa Barbara, CA
- 208 W Haley Street, Santa Barbara, CA
- 434 De La Vina Street, Santa Barbara, CA
- 221 W Cota Street, Santa Barbara, CA
- 230 W Cota Street, Santa Barbara, CA
- 532 Bath Street, Santa Barbara, CA
- 536 Bath Street, Santa Barbara, CA
- 631 Bath Street, Santa Barbara, CA
- 633 Bath Street, Santa Barbara, CA
- 303 W Ortega Street, Santa Barbara, CA
- 306 W Ortega Street, Santa Barbara, CA
- 308 W Ortega Street, Santa Barbara, CA
- 326 W De la Guerra, Santa Barbara, CA

In addition the COE has determined that the following are eligible for the NRHP under Criterion C:

- 118 Chapala Street, Santa Barbara, CA
- 120 Chapala Street, Santa Barbara, CA
- 20 W Mason Street, Santa Barbara, CA
- 309 W Ortega Street, Santa Barbara, CA
- 311/313 W Ortega Street, Santa Barbara, CA
- Chapala Street Pony Truss Bridge
- Mission Creek Diversion

The COE has also determined that the Lower Mission Creek Flood Control Project will have no adverse effect on historic properties. Based on review of the submitted documentation, I concur with the foregoing determinations.

Thank you for considering historic properties during project planning. If you have any questions, please contact Natalie Lindquist of my staff at (916) 654-0631 or e-mail at nlind@ohp.parks.ca.gov.

Sincerely,

M Greenberg for

Daniel Abeyta, Acting
State Historic Preservation Officer

- 120 Chapala Street, Santa Barbara, CA
- 20 W Mason Street, Santa Barbara, CA
- 309 W Ortega Street, Santa Barbara, CA
- 311/313 W Ortega Street, Santa Barbara, CA
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Sincerely,

Original Signed By

Daniel Abeyta, Acting
State Historic Preservation Officer

DEPARTMENT OF THE ARMY
LOS ANGELES DISTRICT, CORPS OF ENGINEERS
P.O. BOX 532711
LOS ANGELES, CALIFORNIA 90053-2325

REPLY TO
ATTENTION OF:

December 20, 1999

Office of the Chief
Environmental Resources Branch

Mr. Peter Douglas
Executive Director
California Coastal Commission
Attn: Mr. Jim Raives
45 Fremont, Suite 2000
San Francisco, California 94105

Dear Mr. Douglas:

The U.S. Army Corps of Engineers (USACOE), submits this Coastal Consistency Determination (CCD) for the Lower Mission Creek Flood Control Project, Santa Barbara, California for your review and consideration. The USACOE has initiated coordination with Mr. Jim Raives of your staff to determine the need for a CCD. A copy of the Draft Feasibility Report and Draft Environmental Impact Statement/Environmental Impact Report is also provided for detailed analysis for each environmental resources.

The study is limited to the final 1.2 miles of the creek, between Canon Perdido Street and Cabrillo Boulevard This study does not extend to the lagoon. The proposed project would provide 3400 cubic feet per second (cfs) of capacity and approximately a 20-year level of flood protection. A project description is provided in enclosure 1 of the CCD. Environmental commitments or mitigation measures have been developed for each environmental resource to avoid or minimize project related impacts (enclosure 2). Information for the biological resources can be found in the HEP analysis report, Biological Assessment and USFWS's Coordination Act Report (enclosure 3, 4 and 5).

Your timely concurrence of this CCD would be greatly appreciated to allow project construction to commence on the scheduled date. If you have any questions regarding this project please contact Ms. Joy Jaiswal, Environmental Coordinator at (213) 452-3871, or Dr. John Moeur, project biologist at (213) 452-3874.

Thank you for your time and attention to this request.

Sincerely,

Robert E. Koplin, P.E
Chief, Planning Division

Enclosures

APPENDIX - K

PUBLIC COMMENTS AND RESPONSES ON DRAFT EIS/EIR LOWER MISSION CREEK FLOOD CONTROL PROJECT SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

February 7, 2000

U.S. Army Corps of Engineers
Los Angeles District
Environmental Resources Branch
P.O. Box 532711 (CESPL-PD-RL)
Los Angeles, CA 90053-2325

Attention: Ed Demesa, Study Manager

Dear Mr. Demesa:

The Environmental Protection Agency (EPA) has reviewed the U.S. Army Corps of Engineers' (COE) Draft Environmental Impact Statement (DEIS) for the **Lower Mission Creek Flood Control Project, Santa Barbara County, CA.** Our comments are being provided pursuant to the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) Regulations (40 CFR 1500-1508), and Section 309 of the Clean Air Act.

The DEIS evaluates no action (alternative number 1) and three action alternatives (numbers 6, 8, and 12) to address elements of flood control and channel restoration along Lower Mission Creek in Santa Barbara County. These four alternatives are those carried forward from the broader array of alternatives considered in the COE's Feasibility Study. Under the no action alternative, the existing channel, with a capacity of approximately 1500 cubic feet per second (cfs) would remain in place and flooding would remain problematic. Each of the three action alternatives would result in an increase of channel capacity to 3400 cfs, providing a 20 year level of flood protection. The three action alternatives being evaluated in the DEIS are physical variants of one another, each having subtle, but sometimes significant, differences in construction configuration.

The COE has identified alternative 12 as their "tentatively recommended plan," further describing that alternative as being environmentally superior to the other alternatives. In addition, alternative 12, according to the COE meets National Economic Development (NED) status. Implementation of the COE's "tentatively recommended plan" would result in establishing a natural bottom for the last mile of the creek below Canon Perdido Street Bridge at the upstream end; replacing five bridges; streamlining bedslope; installing a culvert that bypasses the oxbow; stabilizing creek banks with vertical walls and riprap sideslope; incorporating native plantings along the riprap; and constructing six small habitat expansion zones and a wetland.

Responses to the comments from:

U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, CA 94105

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciates your comments vital to the success of this flood control project.

The proposed project, as designed, has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area with a higher level of flood protection and improve the riparian community along the creek. In order to provide that increase in flood protection while maintaining the natural creek bottom and restoring the riparian corridor, widening the Creek is required.

In determining a rating for the document and proposed project, we have assumed that alternative 12, the COE's "tentatively recommended plan" is also the COE's preferred alternative as defined in CEQ Regulations. As such, we have assigned a rating of **EC-2, Environmental Concerns - Insufficient Information.** For a detailed explanation of our rating system, please refer to the Ratings Summary, attached.

While we concur that alternative 12 will increase biological, visual, and water resource values associated with Mission Creek, the concerns and recommendations we've outlined below should be addressed in the Final EIS.

Com. # 1

1. Alternative 12 would result in an overall expansion of channel width in lower Mission Creek. However, in the few areas with significantly narrower channel widths, stream velocities could result in scouring and undermining of bridge structures and retaining walls. Between Cota Street and Halet Street, the channel width is reduced to 55 feet to accommodate existing structures. This narrowing is associated with a vertical channel wall. Energy dissipation structures, such as large boulders already in place elsewhere up and down-gradient of this area should be considered.

Com. # 2

2. The wetlands area proposed for the entrance to the oxbow diversion channel would be subjected to periodic flooding. The impact of periodic flooding on this wetland is not fully addressed. The design of the created wetland should maximize the use of this area as a retention basin for flood events and be constructed so as to protect the area from wash-outs.

Com.# 3

3. The FEIS should fully address the issue of how the COE plans to prevent the oxbow diversion culvert from being clogged with debris during storm events. We recommend that the COE consider a debris catchment or dam as part of the design for the oxbow diversion culvert.

Com.# 4

4. Habitat for the endangered Tidewater Goby (Eucyclogobius newberry) was not fully addressed. This is the subject of previous comments from EPA (1988) and the U.S. Fish and Wildlife Service (USFWS). EPA concurs with the USFWS in that a survey of the Tidewater Goby in the existing environment should be completed prior to implementation of the proposed project. The design for the tidal inflow area between Yanomali Street and the Cabrillo Street bridge should insure that existing conditions of temperature and salinity are met. Although the DEIS/Feasibility Study suggests that widening of the channel in this area would be beneficial to the species by increasing the amount of habitat, no scientific validation is provided. The FEIS should provide such validation and should also discuss the potential adverse results of widening the stream channel such as potentially decreasing available water depth and increasing water temperatures which could adversely affect the Tidewater Goby.

1-1. Hydraulic modeling reveals that the expected velocities of stormwater flows from the Cota Street Bridge to Haley Street Bridge would be slower compared to velocities across De la Guerra Street Bridge and hence no stream bed armoring is required between Cota and Haley Streets.

1-2. Due to the abundance of concerns with expected maintenance needed for a wetland to survive at this location, the area initially proposed as a wetland has been redesigned into a proposed expanded habitat zone similar to several sites already in the project.

1-3. To address concerns about potential blockage of the culvert, the culvert has been redesigned into a pair of 15'X 6' boxes. Furthermore, the splitter wall will be designed into a "bullnose" to help minimize the potential of getting debris hung up in the divider wall.

1-4. During the evaluation of the biological resources affected by the proposed project, the Corps coordinated extensively with USFWS. In April and May 1999, representatives of the Corps and USFWS surveyed the estuary and could not confirm the presence of the Tidewater goby. However, literature review found that previous surveys have confirmed the presence of tidewater gobies in this area (Lafferty and Altstatt, 1995). The Corps agrees that scientific validation has not been provided.

	Thank you for the opportunity to review the DEIS. Please send two (2) copies of the FEIS to my attention (mailcode CMD-2) at the letterhead address at the same time that copies are filed with EPA Headquarters. Should you have questions, please contact Rosalyn Johnson at 415-744-1574 or Shirin Tolle at 415-744-1898 Sincerely, David Farrel, Chief Federal Activities Office cc: J. Jaiswal (LA COE) R. Leidy (WTR-8) S. Tolle (WTR-5) Attachment: EPA Ratings Summary 003189	However, hydrologic studies of the project show that the project as designed would double the surface area and maintain the existing depth of the water in the estuary. In addition, there would be no change in the amount of shade from the existing conditions; therefore, no change in temperature is expected.

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
600 Harrison Street, Suite 515
San Francisco, California 94107-1376

March 3, 2000

ER 00/0040

U.S. Army Corps of Engineers
Colonel John Carroll
District Engineer, Los Angeles District
Attn: CESPL-PD-RL, CESPL-PD-WA
P.O. Box 532711
Los Angeles, California 90053-2325

Dear Colonel Carroll,

The Department of the Interior (Department) has reviewed the Draft Environmental Impact Statement and Environmental Impact Report (DEIS/EIR) and Draft Feasibility Report for the Lower Mission Creek Flood Control Project, Santa Barbara, California. The Department's comments center on the potential for the project to restore and enhance habitat for listed fish species-- steelhead and tidewater goby. The U.S. Fish and Wildlife Service (Service) has substantially commented on this proposed Project in a draft Fish and Wildlife Coordination Act Report (DCAR) which was sent to your office in December of 1999. The DCAR is included in the DEIS as Appendix B.

GENERAL COMMENTS

Com.#2-1

The Santa Barbara community has a history of endorsement of its natural riverine systems dating from at least the 1960's (Feasibility Report, Chapter III, page 4) through recent times (Appendix I, Public Scoping – Comment Letters). For example, the City's General Plan Conservation Element (Feasibility Report, Chapter III, page 71) stipulates:

- The riparian resources, biological productivity, and water quality of the City's coastal creeks shall be maintained, preserved, enhanced, and where feasible, restored.
- The habitat of rare and endangered species shall be preserved.
- Intertidal and marine resources shall be maintained or enhanced.

The report indicates (page 72, first two lines): "These goals and polices will be used as the evaluation criteria for the assessment of with-project biological impacts and mitigation." Yet, the Draft EIS gives only cursory reference to any type of ecological restoration to the Mission Creek

Letter from:

Patricia Sanderson Port
Office of Environmental Policy and Compliance
U.S. Department of Interior
600 Harrison St., Suite 515
San Francisco, CA 94107-1376

2-1 The flood control project would require modification to the creek upstream of the lagoon. Modification to his area is not needed in order to achieve the design conveyance capacity. The project expects to have no impacts to this area. In the estuary upstream of the lagoon up to the extent of tidal interface, the project proposes to create a wider channel, which would consequently, more than double the size of the estuary habitat. Additionally physical features In the form of fish baffles, fish ledges, textures walls as goby refuge, which would mitigate and contribute to the restoration and enhancement of the estuary.

In the future, if a non-Federal sponsor is interested in the restoration of the degraded ecological resources of the lagoon the Corps could pursue a study under other existing restoration type of authority, such as Sections 1135 and 206 programs.

2-2 The USACOE has prepared a long term mitigation monitoring plan for the planted vegetation and for the listed endangered and threatened species. Criteria and goals have been developed for the success of the planted vegetation and minimizing impacts to the aquatic habitat. See details in appendix B (Biological Assessments, and Biological Opinion for steelhead) and appendix H and Chapter 10 for details.

project site. No mention was made of the mouth of Mission Creek and its tidal interface. We recommend that the Mission Creek project include more proposed restoration or enhancement of the degraded ecology.

Com.#2-2

SPECIFIC COMMENTS

Feasibility Report, Chapter V, DESCRIPTION OF THE SELECTED PLAN, B. Locally-Preferred Plan, page 98. Although the Feasibility Report mentions biological resources of concern (pages 38-39), the Report dismisses ecological restoration of Mission Creek with one paragraph (page 98, third full paragraph), saying "Planting along the riprap and planting of native trees in habitat expansion zones are an integral part of the project design." No further explanation of restoration techniques or measures is indicated, and the paragraph continues, "Therefore, no biological mitigation will be required."

We suggest that several ecological considerations could be made:

Com. # 2-3

- Incorporating revegetation, especially of the native southern cottonwood-willow riparian forest, into the proposed construction project might provide a cost-effective opportunity for enhancing the proximal environment while developing the channel for flood control purposes. Because of public concern about use of native vegetation rather than non-indigenous weedy species, we would like to bring to your attention the work of the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW). The FICMNEW is an active committee that identifies and monitors invasive non-indigenous plant species. The Committee's initial report is referenced:

  Westbrooks, R., 1998, Invasive plants: changing the landscape of America: Fact book. Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW), Washington, D.C. 109 pp.

  Further information on weedy species can be accessed at http://refuges.fws.gov/FICMNEWFiles/FICMNEWHomePage.html

Com.# 2-4

- Proposing specific measures in the Report for steelhead and the tidewater goby habitat restoration. The U.S. Fish and Wildlife Service will be providing detailed information on the tidewater goby during formal consultation under Section 7 of the Endangered Species Act. Additional recommendations from the Service on enhancing aquatic habitat is found in Appendix B of the Report. For further information on these species' habitat requirements, we would like to suggest several research projects done by the USGS Biological Resources Division. These can be researched at the USGS URL: http://biology.usgs.gov/ under "Current Projects", "BRD Centers", or "Cooperative Research Units". Samples of these research projects include the following: (BRD Centers and Cooperative Research Units are in parentheses.)

	• Biological assessment (steelhead trout) of streams in the King Range Conservation Area (California Cooperative Fishery Research Unit). • Status of the tidewater goby and assessment of environmental variables associated with its abundance and distribution in California lagoons and estuaries (Western Fisheries Research Center). Further references include: Lafferty, K. D., Swift, C. C., and Ambrose, R. F., 1999, Postflood persistence and recolonization of endangered tidewater goby populations. North American Journal of Fisheries Management. v. 19, p. 618-622. Lafferty, K. D., Swift, C. C., and Ambrose, R. F., 1999, Extirpation and recolonization in a metapopulation of an endangered fish, the tidewater goby. Conservation Biology v. 13, p.1-8.	2-3	All planting materials will be local native species, preferably collected from the coastal portion of Mission Creek and nearby creeks. See appendix H (Monitoring Plan) for the species list, and removal of exotic vegetation is incorporated into the mitigation monitoring plan.
		2-4	Please see Biological Resources Section for additional measures to improve steelhead and tidewater goby habitat, including a weir at the upper end of the oxbow to assure that low flows continue to flow through the oxbow, fish ledges, boulder fields, vertical ribbing for goby refugia and other mitigations. The USACOE has coordinated with NMFS and USFWS for developing mitigation measures to minimize impact to the federally listed species. Conditions identified in the Biological Opinion from the NMFS for steelhead in appendix B-1 (Biological Opinion for steelhead) will be followed to minimize impacts to steelhead. Mitigation measures identified in the biological assessments in section 10 and 24 of the EIS will be followed to minimize impacts to the federally listed species. Thank you for your recommendation to obtain additional information from the USGS URL.
Com.#2-5	• The Department also recommends that the Corps apply the recommendations found on page 28 in Appendix B, *AVOIDANCE OF IMPACTS TO BATS AND NESTING BIRDS* to protect resident bats. We thank you for the opportunity to comment on this EIS. Sincerely, Patricia Sanderson Port Regional Environmental Officer cc: Director, OEPC, w/original incoming Regional Director, FWS, Portland Director, USGS, Reston, VA	2-5	Project area does not support bats according to a biological survey of the project area.

U.S. Department of Transportation
United States Coast Guard

Commander (oan-2)
Eleventh Coast Guard District

Coast Guard Island
Alameda, CA 94501-5100
Phone: (510) 437-3514
FAX: (510) 437-5836

16591/3
Lower Mission Creek
Ser: 043-00
February 4, 2000

Mr. Ed Demesa
Plan Formulation Branch
U. S. Army Corps of Engineers
P. O. Box 532711
Los Angeles, CA 90053-2325

Dear Mr. Demesa:

I received your Notice of Public Review and Public Meeting but am unable to participate directly in Santa Barbara's Feasibility Study. The Coast Guard's jurisdiction for bridge administrative functions encompasses waters under the influence of tides, along with those with potential for development into navigable waterways.

Com. # 3-1

I have not seen the current study, but it was proposed in 1986 to remove the sand bar from the mouth of Lower Mission Creek. Sand bar removal would allow navigation past all 7 bridges, and the Coast Guard would authorize any changes to vertical or horizontal clearances at those bridges under advance approval (33 CFR 115.70). We would similarly consider an advance approval for any new bridge location or design. Mission Creek is listed as Advance Approval from the its mouth to the limit of tidal effect from the mouth of the waterway.

Please forward us the final environmental document.

If you need further information if future modifications to bridges occur, I will prepare advance approval correspondence. Please contact Bridge Administrator, Susan Worden, or myself at the above phone or fax numbers.

Sincerely,

R. G. BRUNKE
Commander, U. S. Coast Guard
Chief, Aids to Navigation
and Waterways Management Branch
By direction of the District Commander

Copy: CG Marine Safety Office Los Angeles/Long Beach
U. S. Army Corps of Engineers, Los Angeles District

Responses to the comments from:

US Dept. of Transportation
US Coast Guard
Coast Guard Island
Alameda, CA 94501-5100
R.G. Brunke, Commander

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciates your comments vital to the success of this flood control project.

3-1 The Corps will coordinate with your office any modification and reconstruction of bridges crossing lower Mission Creek. During the next phase of the project, wherein detailed plans will be developed for the bridges identified to be replaced, the Corps, the City and the County will coordinate a review with your office and seek Advance Approval IAW 33 CFR 115.70. End

STATE OF CALIFORNIA

Governor's Office of Planning and Research

State Clearinghouse

Gray Davis
GOVERNOR

Loretta
DIR

February 11, 2000

RECEIVED
FEB 16 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

JANICE M. HUBBELL
CITY OF SANTA BARBARA, PLANNING DIVISION
P.O.BOX 1990
SANTA BARBARA, CA 93102-1990

Subject: LOWER MISSION CREEK FLOOD CONTROL PROJECT
SCH#: 1998101061

Dear JANICE M. HUBBELL:

Com.# 4-1

The State Clearinghouse submitted the above named Draft EIR to selected state agencies for review. The review period closed on February 10, 2000, and no state agencies submitted comments by that date. This letter acknowledges that you have complied with the State Clearinghouse review requirements for draft environmental documents, pursuant to the California Environmental Quality Act.

Please call the State Clearinghouse at (916) 445-0613 if you have any questions regarding the environmental review process. If you have a question about the above-named project, please refer to the eight-digit State Clearinghouse number when contacting this office.

Sincerely,

Terry Roberts

Terry Roberts
Senior Planner, State Clearinghouse

Responses to the comments from:

Terry Roberts
State Clearinghouse
Governor's Office of Planning and Research
P.O. Box 3044
Sacramento, CA 95812-3044

4-1 Receipt acknowledged. Thank you for distributing the Draft EIS/EIR to the concerned resource agencies. Your comment is noted.

SCH# 1998101061
Project Title LOWER MISSION CREEK FLOOD CONTROL PROJECT
Lead Agency Santa Barbara, City of

Type elr Draft EIR

Description The EIS/EIR specifically addresses Alternatives 12, 6, and 8. These alternatives would increase the channel capacity to 3,400 cubic feet per second (cfs), providing a 20-year level of protection. Channel improvements would occur on approximately the last mile of the creek between the Canon Perdido Street Cabrillo Boulevard Bridges. Alternative 12, the National Economic Development (NED) tentatively recommended plan, includes: natural creek bottom; replacement of five bridges, streamlining bedslope. Installing a culvert that bypasses the oxbow; stablizing creek banks by using a combination of short vertical walls and vegetated riprap in most places with vertical walls at bridges and at other constrained locations; and construction of habitat zones and a wetland. Alterative 6 consists of: natural creek bottom; stabilized creek banks with vertical walls and vegetated stepped banks; replacement of seven bridges; streamlining bedslope; construction of habitate zones and a wetland; and the oxbow would widened to contain higher flows. Alterantive 8 consists of: natural creek bottom; stabilization of creek banks with vertical concrete walls; replacement of five bridges; streamlining bedslope; installing a culvert that bypasses the oxbow; and construction of habitate zones and a wetland. Future maintenance is an integral part of the project design for all alternatives identified above, and is included in the project description for the life of the project. Project design incorporates planting of vegetation along upper banks, within vacant remnant land parcels, and construction of a wetland. In addition, Alternative 1, the No Action alternative, is considered in the EIS/EIR.

Lead Agency Contact

Name JANICE M. HUBBELL
Agency CITY OF SANTA BARBARA, PLANNING DIVISION
Phone (805)564-5470 **Fax**
email
Address P.O.BOX 1990
City SANTA BARBARA **State** CA **Zip** 93102-1990

Project Location

County Santa Barbara
City Santa Barbara
Region
Cross Streets BETWEEN CARRILLO ST. AND THE OCEAN
Parcel No. SEVERAL DOZEN
Township **Range** **Section** **Base**

Proximity to:

Highways US 101, SR 225, SR 192-SR 144
Airports
Railways UPRR
Waterways MISSION CREEK, LAGUNA CHANNEL
Schools SANTA BARBARA CITY COLLEGE, FRANKLIN, MCKINLEY & HARDING SCHOOLS
Land Use The area of project is partially in the following zones: Commercial (C-2); Multiple Family Residential (R-3); Multiple Family Residential/Hotel (R-4); project is partially within the following General Plan Designations: Buffer/Stream; Residential, 12 units/acre; Hotel and Related Commerce I and II; General Commerce.

State Clearinghouse Data Ba

Project Issues	Aesthetic/Visual; Coastal Zone; Drainage/Absorption; Flood Plain/Flooding; Noise; Recreation/Parks; Traffic/Circulation; Vegetation; Water Quality; Wetland/Riparian; Wildlife; Cumulative Effects; Air Quality; Archaeologic-Historic; Economics/Jobs; Geologic/Seismic; Population/Housing Balance; Public Services; Soil Erosion/Compaction/Grading; Solid Waste; Toxic/Hazardous; Water Supply; Growth Inducing; Landuse
Reviewing Agencies	Resources Agency; Department of Boating and Waterways; California Coastal Commission; Department of Fish and Game, Region 5; Office of Historic Preservation; Department of Parks and Recreation; California Highway Patrol; Department of Water Resources; Caltrans, District 5; Regional Water Quality Control Board, Region 3; Native American Heritage Commission; Public Utilities Commission; State Lands Commission; Department of Conservation

Date Received 12/28/1999 *Start of Review* 12/28/1999 *End of Review* 02/10/2000

City of Santa Barbara

California

HISTORIC LANDMARKS COMMISSION
MINUTES

January 5, 2000 David Gebhard Public Meeting Room: 630 Garden Street 1:30 P.M.

COMMISSION MEMBERS: DONALD SHARPE, Chair, Present
LOUISE BOUCHER, Vice-Chair, Present
ROBERT ADAMS, Present, Left at 4:20 p.m., Returned at 4:24 p.m.
TOM BOLLAY, Present at 1:42 p.m.
EDWARD CELLA, Present
PETER EHLEN, Present
WILLIAM LAVOIE, Absent
HENRY LENNY, Present
ANTHONY SPANN, Present

ADVISORY MEMBER: DR. MICHAEL GLASSOW, Absent
CITY COUNCIL LIAISON: GIL GARCIA, Absent
GREGG HART, Absent
PLANNING COMMISSION LIAISON: BARBARA CHEN LOWENTHAL, Present
STAFF: JAIME LIMÓN, Design Review Supervisor, Present, Left at 1:46 p.m.
CHRISTINE SAVAGE PALMER, Associate Planner/Urban Historian, Present, Left at 4:03 p.m.
CYNTHIA CHAMBERS, Planning Technician II, Present
SUZANNE JOHNSTON, Recording Secretary, Present

** All approvals made by the Historic Landmarks Commission (HLC) are based on compliance with Municipal Code Chapter 22.22 and with adopted HLC guidelines. Some agenda items have received a mailed notice and are subject to a public hearing.

** The approximate time the project will be reviewed is listed to the left of each item. It is suggested that applicants arrive 15 minutes early. The agenda schedule is subject to change as cancellations occur. Staff will notify applicants of time changes.

** The applicant's presence is required. If an applicant is not present, the item will be postponed indefinitely. If an applicant cancels or postpones on item without providing advance notice, the item will be postponed indefinitely and will not be placed on the following HLC agenda. In order to reschedule the item for review, the applicant must fill out and file a Supplemental Application Form at 630 Garden Street (Community Development Department) and submit appropriate plans.

** The Commission may grant an approval for any project scheduled on the agenda if sufficient information has been provided and no other discretionary review is required. Substitution of plans is not allowed, if revised plans differing from the submittal sets are brought to the meeting, motions for preliminary or final approval will be contingent upon staff review for code compliance.

** Preliminary and Final Historic Landmarks Commission approval is valid for one year from the date of the approval unless a time extension or Building Permit has been granted.

** The Commission may refer items to the Consent Calendar for Preliminary and Final Historic Landmarks Commission approval.

** In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Planning Division at (805) 564-5470. Notification at least 48 hours prior to the meeting will enable the City to make reasonable arrangements.

Historic Landmarks Commission
Responses to the comments from:

City of Santa Barbara

Note: The City of Santa Barbara had presented brief status of various projects to the Historic Landmarks Commission. Only Lower Mission Creek Project related concerns are addressed or included in this letter.

Com.# 5-1 to 5-8

HISTORIC LANDMARKS COMMISSION MINUTES January 5, 2000

CONCEPT REVIEW - NEW

5. **LOWER MISSION CREEK**

Assessor's Parcel Number: 033-120-015
Application Number: MST92-00465
Agent: Pat Kelly
Applicant: City of Santa Barbara

(Construction of flood control channel for 1.2 mile stretch of Mission Creek. The flood control project realignment of portions of the creek channel, widening to 60 feet, and construction of an overflow box culv US 101. This is a review of the draft Environmental Impact Statement report.)

(3:36)

Jan Hubbell, Project Planner, Diane Gabriel, Principal Civil Engineer, and Bruce Burnworth, agent, present.

Public comment opened at 4:08 p.m.

Kellem de Forrest, 2651 Todos Santos Lane, asked if the large projects that were previously approved (i.e. California Hotel, etc.) were considered in this proposal.

Gabrielle Boucher, 116 Chapala Street, wanted to thank the Commission for their efforts in trying to pres retain her home as well as others in the neighborhood.

Kate Lundry, 116 Chapala Street, requested to know what the proposed time frame is.

Public comment closed at 4:14 p.m.

Motion: Recommend to the Planning Commission that the Draft Environmental Impact Statement/F accepted with the following comments: 1) The Commission is continually concerned about tl housing, especially historic housing in the waterfront neighborhoods. 2) The DEIS/EIR docs address the historic district potential with regards to the properties along Chapala Street. 3) along both sides of Chapala Street should be studied to create a Landmark District. 3) Incorp use of interpretative signs along the Mission Creek corridor to provide information ar education regarding its natural and historic resources. 4) Significant skyline trees should nc 5) There should be a balance between the creation of a natural habitat, historic resources, and environment. 6) The overall effect of the project should be an improvement to the neigh This is represented in the presentation drawings but may not be reflected in the Corp of I preferred proposal. 7) The City's option is the preferred option. 8) The Commission supports and encourages that the Potter Foot Bridge and the Chapala Street Bridge be prese retained through creative engineering.

Action: Cella/Boucher, 7/0/0.

Historic Landmarks Commission
Responses to the comments from:

City of Santa Barbara

Note: The City of Santa Barbara had presented brief status of various projects to the Historic Landmarks Commission. Only Lower Mission Creek Project related concerns are addressed or included in this letter.

Historic Landmarks Commission
Responses to the comments from:

City of Santa Barbara

5-1 As the result of several design refinements proposed by the City and County, several structures, including historic and non-historic* housing will no longer be removed. These structures include 116 Chapala Street, 536 Bath Street, 308 W. Ortega Street,* and 324 De la Guerra Street.*

5-2 A mitigation measure has already been included requiring that this neighborhood be further studied to determine its eligibility for designation as a landmark District.

5-3 See Response to Comment 5-2. The City will be installing interpretive signs as part of project embellishments paid for by the City.

5-4 Additional design refinements will result in lesser number of skyline trees being removed. The feasibility of saving other significant trees will be revisited during the final design.

5-5 The recommended plan attempts to create balance between providing increased flood

		protection while restoring and saving environmental values including both biological and historic resources. A significant amount of habitat will be created through the creative structural design of the toe wall and vegetated riprap slope. Additional refinements have been incorporated into the plan to minimize impacts to historic structures. 5-6 The project now incorporates the changes requested by the City and the County. 5-7 See Response to Comment 5-6. 5-8. The new design incorporated into the recommended project results in the preservation of Chapala Street Bridge and the Potter Hotel Footbridge.

City of Santa Barbara

California

ARCHITECTURAL BOARD OF REVIEW
MINUTES

January 10, 2000 David Gebhard Public Meeting Room: 630 Garden Street 3:08 P.M.

BOARD MEMBERS: KARL EBERHARD, Chair, Present, Left at 4:42 p.m., Returned at 5:10 p.m.
JEFFREY GORRELL, Vice-Chair, Present
DERRIK EICHELBERGER, Present
CAROL GROSS, Present
ANNIE GUILLEMETTE, Present, Left at 5:35 p.m.
JOHN HUTCHINGS, Present
STELLA LARSON, Present
ALEX PUJO, Present
RICHARD SIX, Present

CITY COUNCIL LIAISON: DAN SECORD, Present, Left at 4:30 p.m.
MAYOR HARRIET MILLER, Absent

PLANNING COMMISSION LIAISON: BARBARA CHEN LOWENTHAL, Present, Left at 6:15 p.m.

STAFF: JAIME LIMÓN, Design Review Supervisor, Present, Left at 3:18 p.m.
DANNY KATO, Associate Planner, Present, Left at 3:31 p.m.
TRISH ALLEN, Planning Technician, Present
MYLEA D. YOST, Recording Secretary, Present

** All approvals made by the Architectural Board of Review (ABR) are based on compliance with Municipal Code Chapter 22.68 and with adopted ABR guidelines. Some agenda items have received a mailed notice and are subject to a public hearing.

** The approximate time the project will be reviewed is listed to the left of each item. It is suggested that applicants arrive 15 minutes early. The agenda schedule is subject to change as cancellations occur. Staff will notify applicants of time changes.

** The applicant's presence is required. If an applicant is not present, the item will be postponed indefinitely. If an applicant cancels or postpones on item without providing advance notice, the item will be postponed indefinitely and will not be placed on the following ABR agenda. In order to reschedule the item for review, the applicant must fill out and file a Supplemental Application Form at 630 Garden Street (Community Development Department) and submit appropriate plans.

** The Board may grant an approval for any project scheduled on the agenda if sufficient information has been provided and no other discretionary review is required. Substitution of plans is not allowed, if revised plans differing from the submittal sets are brought to the meeting, motions for preliminary or final approval will be contingent upon staff review for code compliance.

** Preliminary and Final Architectural Board of Review approval is valid for one year from the date of the approval unless a time extension or Building Permit has been granted.

** The Board may refer items to the Consent Calendar for Preliminary and Final Architectural Board of Review approval.

** In compliance with the Americans with Disabilities Act, if you need special assistance to participate in this meeting, please contact the Planning Division at (805) 564-5470. Notification at least 48 hours prior to the meeting will enable the City to make reasonable arrangements.

** Some projects may be referred to the Disabled Advisory Committee on Access (DACA) for review.

Responses to the comments from:

Architectural Board of Review
City of Santa Barbara

Note: The City of Santa Barbara had presented brief status of various projects to the Arcthitectural Board of Review Only Lower Mission Creek Project related concerns are addressed or included in this letter.

** Many of the items before the Board may be appealed to the City Council. For further information on appeals contact the Planning Division Staff or the City Clerk's office. Said appeal must be in writing and must be filed with the City Clerk at City Hall within ten (10) calendar days of the meeting at which the Board took action or rendered its decision. The scope of this project may be modified under further review.

** If you have any questions, wish to review the plans, or wish to be placed on a mailing list for future agendas for an item, please contact Trish Allen at (805) 564-5470 between the hours of 8:30 a.m. to noon and 1:00 p.m. to 4:00 p.m., Monday through Friday.

LICENSING ADVISORY:

The Business and Professions Code of the State of California and the Municipal Code of the City of Santa Barbara restrict preparation of plans for certain project types to licensed professionals. Applicants are encouraged to consult with Land Use Controls or Planning Staff to verify requirements for their specific projects.

Unlicensed persons are limited to the preparation of plans for:

- Single or multiple family dwellings not to exceed four (4) units per lot, of wood frame construction, and not more than two stories and basement in height;
- Non-structural changes to storefronts; and,
- Landscaping for single family dwellings, or projects consisting solely of landscaping of not more than 5,000 square feet.

NOTICE:

That on January 6, 2000 at 4:00 p.m., this Agenda was duly posted on the Community Development bulletin board, in the office of the City Clerk, and on the bulletin board on the outside of City Hall.

GENERAL BUSINESS:

A. Public Comment:

Any member of the public may address the Architectural Board of Review for up to two minutes on any subject within their jurisdiction that is not scheduled for a public discussion before the Board on that day. The total time for this item is ten minutes. (Public comment for items scheduled on today's agenda will be taken at the time the item is heard.)

No public comment.

B. Approval of the minutes of the Architectural Board of Review meeting of January 3, 2000.

Motion: Approval of the minutes of the Architectural Board of Review meeting of January 3, 2000, with corrections.
Action: Six/Larson, 6/0/3. Eberhard, Gross and Pujo abstained.

C. Consent Calendar.

Motion: Ratify the Consent Calendar. The Consent Calendar was reviewed by Richard Six with the exception of Item Nos. I, N, and P reviewed by Karl Eberhard, and Item No. E which was referred to the full Board.
Action: Gorrell/Pujo, 9/0/0. Eberhard stepped down on Item L.

D. Announcements, requests by applicants for continuances and withdrawals, future agenda items, and appeals.

1. Ms. Allen distributed a memo to the Board from Helene Buchman, Transportation Planning Manager regarding tips for on-camera communication.

2. Mr. Jaime Limón, Design Review Supervisor, reported to the Board that it was Staff's understanding that the Board had a long-standing policy that only allowed a licensed Architect to review projects on the Consent Calendar. However, he stated that the Board is able to set their own rules and procedures on who is able to review the Consent Calendar; this may be done by an unlicensed person if the Board so desires. A discussion will be scheduled on this subject next week.

3. Mr. Pujo announced that he has been appointed by the County Board of Supervisors to a new committee that will be working with CalTrans regarding design issues for the unincorporated areas of the South Coast.

4. Mr. Hutchings announced that he would not be attending the next meeting on January 18, 2000.

E. Subcommittee Reports.

No subcommittee reports.

F. Possible Ordinance Violations.

No reported violations.

Com.# 6-1

To

6-9

CONCEPT REVIEW - NEW ITEM

1. **LOWER MISSION CREEK** P-R Zone

Assessor's Parcel Number: 033-120-015
Application Number: MST92-00465
Agent: Pat Kelly
Agent: Jan Hubbell
Applicant: City of Santa Barbara

(Construction of flood control channel for 1.2 mile stretch of Mission Creek. The flood control project involves realignment of portions of the creek channel, resulting in a 60 foot width, and construction of an overflow box culvert under US Highway 101. This is a review of the draft Environmental Impact Statement report.)

(3:27)

Jan Hubbell, Project Planner, Bruce Burnworth, agent, and Diane Gabriel, Principal Civil Engineer, present.

Motion: Recommend that the Draft Environmental Impact Statement/Report be accepted with the following comments: 1) The Board appreciates City Staff's sensitivity and intensive effort on this project. 2) The City's option is the preferred option. 3) The overall effect of the project should be an improvement to the neighborhood. 4) The Board regrets the lack of pedestrian and visual access along the creek corridor so far in the project and would like it to be expanded. 5) The wall design should be varied. 6) The railing and fencing at the top of the wall should be simple and screened out with landscaping. 7) The engineering features of the vertical walls should be natural in character wherever possible. 8) Preserve the skyline trees. 9) The Board recognizes the importance of the details and wants to be fully involved in their review as a mitigation measure.

Action: Pujo/Hutchings, 9/0/0.

CONCEPT REVIEW - CONTINUED ITEM

2. **900 BLOCK CARRILLO ST.**

Assessor's Parcel Number: 035-012-ROW
Application Number: MST1999-01017
Owner: City of Santa Barbara
Agent: Greg Knudson

(Proposal for a new wall along the south side of Carrillo at La Coronilla. The project includes new sidewalk and parkway on both corners.)

Responses to the comments from:

Architectural Board of Review
City of Santa Barbara

6-1 Comment Acknowledged.

6-2 See response to comment 5-6.

6-3 See response to comment 5-6. The local Lower Mission Creek Design Subcommittee will also be involved in the final project design.

6-4 Due to real estate constraints, providing a pedestrian walkway and visual access along the creek corridor could be part of project embellishments paid for by the City and will be considered by the City during final design.

6-5 See response to comment 6-3.

6-6 See response to comment 6-3.

6-7 See response to comment 6-3.

6-8 See response to comment 5-4.

6-9 See response to comment 6-3.

CITY OF SANTA BARBARA
PARKS AND RECREATION DEPARTMENT
Parks Division

MEMORANDUM

TO: Pat Kelly, Assistant Public Work Director
Jan Hubbell, Project Planner

FROM: Richard C Johns, Parks and Recreation Director

DATE: February 10, 2000

SUBJECT: COMMENTS FROM CITY OF SANTA BARBARA PARKS AND RECREATION DEPARTMENT ON LOWER MISSION CREEK FLOOD CONTROL FEASIBILITY STUDY

The following comments have been compiled from the Parks and Recreation Commission and Parks and Recreation Department staff members including the City Arborist, the Assistant Parks and Recreation Director, the City Landscape Architect and the Park Planner working on Open Space issues on the Feasibility Study for the Lower Mission Creek Flood Control Project.

1. Tree Related Issues:

Com.#7-1 No tree list was included for the plantings in the feasibility study, and in most public presentations, the trees identified for plantings have been willows, sycamore trees and california live oaks. Parks and Recreation staff understand this study is conceptual but at this point the Department would like to voice the need for inclusion of other appropriate riparian trees such as bay trees, poplars, toyon, red bud, elderberry and alders. These trees would add biological diversity and visual diversity to the creek corridor.

Com.#7-2 Staff would also like to emphasize the need for using localized stock for plantings. It is a commonly accepted practice to use locally collected and propagated plant materials in restoration projects in order to retain genetic integrity.

Com# 7-3 Our staff has substantial concerns related to the use of concrete vertical cylinders for the tree plantings. The first concern being that these cylinders will most likely prevent lateral root development which is vital for long term tree stability. The purpose for the use of the vertical cylinders is not clear in the project description; however, if it is to promote deep rooting we recommend the use of a cylinder that allows lateral root development.

The second concern related to concrete cylinders is that the diameter of the cylinders is not large enough. The City Arborist recommends that the diameter of the cylinder be four (4) times the diameter of the root ball. A small diameter cylinder, such as 36", will cause root/crown girdling which can be fatal to the long term health and stability of a mature tree.

Responses to the comments from:

Parks and Recreation Department
City of Santa Barbara

7-1 Except for poplars and red bud, all other species mentioned are proposed to be included in the project planting. The final species list will be coordinated with concerned resource agencies.

7-2 See response to comment 7-1. The text in the EIS/R has been clarified to reflect the intent of using local stock.

7-3 See response to comment 7-1. The cylinders are no more than 30 inches in depth and should allow lateral root development. The Current plan is to use one-gallon stock, which can easily be accommodated within the breakaway cylinder. If the City embellishes with larger tree planting, an alternative planting method may be used.

Com.#7-4	Staff recommends saving as many of the historic sycamores and oaks along the creek as possible including the multi and large trunked sycamore specimens located near most of the bridge crossings and the exceptional specimen located near the gabions on the Funke property.		
Com.#-7-5	**2. Understory Composition** There is little to no discussion about understory composition. Staff recommends a diverse and appropriate cover of midstory shrubs (where appropriate based on security issues), and a ground cover canopy composed of blackberries, appropriate native grasses, etc.	7-5	Your comment is noted. The final species list will be coordinated with concerned resource agencies.
Com# 7-6	It is unclear how deep the soil depth will be above the rip-rap, and if this soil is to be used for plantings. There is one reference to a depth of 6 inches on a 1.5:1 slope, and planting pockets for various trees and shrubs in the Draft Maintenance Plan. Are plantings going to occur on the soil covered rip-rap, or are they only occurring in planting pockets? If the soil covered rip-rap is to be used for plantings Parks and Recreation staff recommend a deeper soil depth be allowed for considering the steep slopes and the movement of soil by gravity, and for rooting capabilities. Parks and Recreation staff would like clarity on this issue. Especially related to "habitat expansion areas".	7-6	Approximately 6 inches of topsoil would cover the riprap. Planting will occur on the riprap slope in addition to planting in the cylinders. Some plants will be placed between the riprap. Greater soil depth could be considered during the preconstruction and engineering design phase.
	3. The Wetlands Creation Area The Parks and Recreation staff views the proposal of a created wetland as an opportunity for environmental education and open space, and as a concern because of the following: • increased maintenance responsibilities • the potential for human encampments, associated security issues, and increased trash • the viability of a created wetland		
Com.#7-7	A created wetland in the middle of the urban framework is an excellent opportunity for environmental interpretation both for visitors and locals. However, the Parks and Recreation staff is concerned about the maintenance responsibility of the created wetland. After preliminary discussions with County Flood Control, City staff understood that Flood Control had no intentions of maintaining this area except related to water conveyance. However, it has been stated at public presentations that the City will have discretion as to which habitat enhancement areas they will maintain. The maintenance component; therefore needs clarification. The Parks and Recreation Department will require the completion of a cost analysis to evaluate financial impacts to the Department related to staffing and related materials/equipment for additional open space areas	7-7	The wetland area has been redesigned to a habitat expansion area. Comment no longer applicable. See response to comment 1-2. Thank you for your suggestion and recommendation.
Com#7-8	Additionally, it was understood from Flood Control representatives that they will require access to this site. If the site is designed as a created wetland, vehicular access should be prohibited as much as possible. An access road on the site could dissect the open space and be counterproductive to wetland habitat function and value. The ideal access for maintenance or water conveyance would be from the north or south of the site which most likely would require a flood control easement from another property.	7-8	An additional access ramp will be included on the easterly side next to the culvert. The ramp on the west side will be relocated to the southerly side of the parcel to minimize interruption of the habitat expansion zone.

Com.#7-9	The creation of this open space area has the potential to create both a viable human encampment area and a site for trash collection. Design to discourage human encampments will require actively encouraging public use of the space - (an excellent setting for environmental education purposes), regular reconnaissance by enforcement staff, and maintenance procedures that reduce the means for human habitation. A program for regular trash removal and a means to reduce litter will need to be incorporated to the plan.	7-9	The design for this area will be similar to the proposed habitat expansion areas already included in the recommended plan. The final design will consider features to discourage encampment or human habitation.
Com.7-10	Staff recommends a detailed analysis of the viability of a created wetland on this site be completed before final approval. Staff questions whether there will be enough ground water supplied to this area year round, because high flows during the winter will be diverted away through a culvert, and our normal summer flow is low. What type of wetland is being created and has a study been completed to evaluate existing ground water storage?	7-10	The wetland area has been redesigned to a habitat expansion area. Comment no longer applicable.
Com.#7-11	**4. Increased Width of Creek Bed at Cabrillo Area** Staff has concerns about the increased width of the creekbed at the Cabrillo and State St. area. These concerns are related to spreading the flow of water over a wider area. Although staff understands the historic context of an estuary, the current water quality and its relationship to nutrient loading, low summer flows, and a lack of vegetation to absorb nutrients causes concern both from a hydrologic and aesthetic perspective. Warm water temperatures and increased algae blooms reduce available oxygen and contribute to unpleasant odors associated with unnatural nutrient loading in the creek. The shade provided by tree canopies and the nutrient absorption properties of other vegetation can moderate nutrient loading, warm water temperatures. Staff would like assurances that a hydrologic study has been completed to evaluate the successful function of the creek under the new design parameters.	7-11	See response to comment 1-4. A hydrologic study has been completed. The width of the area from State Street to the ocean will remain unchanged. Additional modeling will occur during final design.
Com.7-12	**Shade Study** Staff concurs with the Planning Commission's recommendation that a shade study should be completed for the tree plantings and vertical walls. The increased width of the creek raises concerns about shading the creek corridor and moderating water temperatures. The ratio of shade, to depth of the creek has a large impact on water temperature which directly affects algal growth, available oxygen and quality habitat for aquatic species.	7-12	A shading study has been completed and included in the EIS/R. Extensive shading would be realized within five years and after ten years, coverage of the wider creek would nearly be complete. Currently, at the lowest reach hardly any shading is available.
Com.#7-13	**Tot –Lot Opportunities Within Expanded Habitat Zones** The Parks and Recreation staff has evaluated the habitat expansion sites for small tot lot opportunities. The Bath and Ortega Street site appears to be the only appropriate location. Green space and tot lots are severely lacking in this densely urbanized portion of Mission Creek. Security, safety and habitat issues would need resolve at the design level of evaluation.	7-13	Final design of the City embellishments, including tot lots, will include features for safety, security and habitation issues.
Com,#7-14	**Trails** To the maximum extent possible both the Commission and staff believe trail opportunities should be developed. Although a contiguous "river walk" is not possible with existing constraints, opportunities do exist at bridge crossings, habitat expansion	7-14	See response to comment 6-4. Additionally, environmental education and historical interpretive signs would be part of City embellishments.

	areas and other view points for environmental education and historical interpretation. Staff suggests that at the waterfront area where vertical walls would require a ten (10) foot height for the incorporation of a trail, that it might be possible to design a perched path at 8 feet (the height currently planned for at this location), and that a stepped back wall of 2 feet could be added for the 10 foot height that would be required. During high flows the trail would be submerged. Staff believes that there are other areas where this type of trail design could be incorporated to the vertical walls across public land sites.	
Com.#15	**Draft Maintenance Plan** The Draft Maintenance Plan makes reference to several methods and processes that will be required for regular maintenance. As stated earlier in this memo, it is not clear who will have the responsibility for the habitat expansion areas, the created wetland, and additionally for monitoring. Will it be County or City responsibility? **City Parks and Recreation Commission Comment** The Parks and Recreation Commission emphatically embraces the idea of making the creek more visible to build respect for this natural feature of our city. They believe the ability to expand the riparian habitat should be done to the maximum extent. However, their concerns echo staff's related to encampments, enforcement, trash collection, and financial impacts. Further, they believe that the creeks have not received appropriate respect and hope the opportunities and costs associated with habitat expansion, provision of visual access and environmental education will be undertaken by the sponsors of this project. Cc: Dan Condon, City Arborist Billy Goodnick, Landscape Architect Jeff Cope, Assistant Parks and Recreation Director Allyson Biskner, Associate Park Planner Parks and Recreation Commission	7-15 The Corps will maintain the habitat expansion areas until such time that the project is turned over to the County and City. Henceforth, maintenance will be based on their agreement

Draft

City of Santa Barbara
PARK COMMISSION
and
RECREATION COMMISSION

Regular Monthly Meeting

January 26, 2000

MINUTES

The regular meeting of the Park Commission and Recreation Commission was called to order by Chair Hughes at 5:45 p.m. in City Hall Council Chambers.

12.
ROLL CALL

Commissioners Present	
Linda Hughes	Park/Recreation Commissioner
Beebe Longstreet	Park/Recreation Commissioner
Mary Frink	Park/Recreation Commissioner
Esther Baum	Park Commissioner
David Gress	Park Commissioner

Commissioners Absent	
Michael Magne	Recreation Commissioner
Ada Connor	Recreation Commissioner
Andrew Schwartz	Recreation Commission Intern

Staff Present	
Richard Johns	Parks and Recreation Director
Molly Carrillo-Walker	Assistant Parks and Recreation Director
Jeff Cope	Assistant Parks and Recreation Director
Jean Feigenbaum	Recreation Supervisor
TK	

13.
APPROVAL OF MINUTES
a. Regular Meeting of December 15, 1999

Commissioner Longstreet moved, seconded by Commissioner Gress, and passed 5/5 that the Commission approve the minutes of these three meetings..

b. Special Meeting – Honda

Responses to comments from:

Parks and Recreation Commission
City of Santa Barbara

8-1 Comment acknowledged. See responses to comments 7-1 through 7-15.

Chair Hughes concurred and said TK was an excellent spokesperson for the City of Santa Barbara Parks and Recs.

d. Informational Items

(1) Application Schedule – Commission Appointments

Mr. Johns advised that Commissioner Gress' and Commissioner Frink's terms are coming up for renewal as well as the DFPAC. (SEE THE FORM FOR THE COMMITTEES THEY SERVE ON)He said deadline is January 31st for applications.

(2) Proposition 12 Informational Meeting, January 27, 2000, 7:00 p.m.

Mr. Johns advised the Commission about the meeting regarding Prop 12 and 13. He explained Proposition 13. He encouraged Commissioners to attend. Chair Hughes asked who is presenting. CPRS and other organizations statewide.

30. UNFINISHED BUSINESS

a. Public Works Department Presentation Regarding Environmental Review – Lower Mission Creek

Mr. Cope advised that the Lower Mission Creek plan is currently in the comment phase of environmental review. He pointed out that the project offers several recreational habitat enhancement area opportunities and also poses some issues that are of concern to staff regarding continued management of the project after its initial completion. Mr. Cope explained that the project offers possible recreational opportunities in the form of trails, neighborhood parks, interpretive opportunities, restoration. He further commented on staffs' concerns which are encampments, management, and maintenance. He advised the Commission that this is their opportunity to provide comments on the plan to the Planning Commission. He said that the Public comment period closes on February 10, 2000.

Mr. Pat Kelly, Assistant Public Works Director, and Jan Hubbell, Community Development.

Mr. Pat Kelly provided a brief history and background of the project and then presented the current plan, which is currently in the comment phase of environmental review.

Chair Hughes asked whether a hard wall is legal, so the property lines vary in different locations. Mr. Kelly said that part of it is private. He said that the COE, County and City are part of the project.

Ms. Jan Hubbell interjected stating that some of the hard walls are legal; they have been there a long time. It is tough and unattractive. She said there are walls that are illegal and interfere with the County Flood Control.

Ms. Hubbell briefly explained the Environmental Review process. (SEE TAPE)

Mr. Kelly said the key element of the design process is that the sub-committee review the design.

Chair Hughes asked whether Public Works plans to do this same type of project on other creeks. Mr. Kelly responded saying this project is based on a long-term need for flood control. He said as far as following up the creek the first step is to do an inventory of all the creeks. Once completed, opportunity projects for enhancements will be identified.

Commissioner Longstreet asked whether we are looking at five years out for the project moving forward. Mr. Kelly said yes. (SEE TAPE) She further clarified that once the land has been acquired, the Commission could look at recreational opportunities. She asked a question regarding trees (SEE TAPE). Jan Hubbell said seven to fifteen major trees would need to be removed. She said there is no way to avoid these removals. She also said there are some large sycamore trees that they might be able to save, commenting that they may be able to reduce the number of trees requiring removal to seven. Finally, she expressed her appreciation for the efforts made towards this project.

Commissioner Gress expressed his concern for maintenance of the plantings and pathways once the project is complete. Mr. Kelly said the County Flood control will be responsible for maintenance. (SEE TAPE RE Riparian Habitat) For the most part it will be a self-scouring channel. Gress stated he was curious as to the impact on the City Parks and Recreation maintenance staff.

Commissioner Frink asked whether this project will improve the

water quality coming up from the ocean. Mr. Kelly said that this project will simply be the annual maintenance by the COE to remove the feces in the creek. He further said the allowance of vegetation in the channel will have little impact on water quality.

Ms. Hubbell said there is benefit in that as the vegetation grows and shades the area the water temperature will be lower; lower water temperature, better water quality.

Chair Hughes asked if this project will address what the creek looks like near _____. Mr. Kelly said (SEE TAPE)

Ms. Hubbell said that the estuary will be muddy, smell, and unsightly sometimes.(SEE TAPE)

Mr. Johns interjected that the Commission should comment on the plan. Ms. Hubbell said that the Commission could submit their comments individually to Mr. Cope or Ms. Biskner. Ms. Biskner encouraged the Commission to make their comments tonight.

Commissioner Longstreet asked if there is an ordinance prohibiting drinking alcoholic beverages in that area and whether the tools are available to enforce and cite. She further expressed that if there were no enforcement capability, it may become a human habitat. Mr. Kelly was unsure and said that currently it is private property.

Commissioner Longstreet also said that the Commission would like public comment regarding the recreational activities in the area.

Commissioner Gress said this is an opportunity to enhance the creek and expand the habitat and it should be done to the maximum extent possible. He further said that if there were opportunities to expand the property, we should.

Chair Hughes concurred and stated that Mission Creek is a creek that we have long turned our back on and since we are addressing the issue, we should embrace it. (SEE TAPE FOR CLARIFICATION) Ms. Biskner suggested we amend this to clarify her comment (SEE TAPE) Chair Hughes clarified stating that she did not want to sound as though she had not respect for private property. She simply feels visual access would be good.

Mr. Kelly said the County intends to allow public access. (CHECK THE TAPE)

Ms. Biskner said that San Luis Obispo has limited access to creeks. She stated it does need to be limited for water quality issues.

Commissioner Baum asked for clarification since much of the project impacts private property, will the trees that need to be removed be from private property.

Chair Hughes also said that if we have the opportunity we should make every attempt to provide this to the community and further that the Parks and Dept should absorb the cost.

Mr. Johns suggested we adjourn this and take rec 28A

b. Creeks Strategic Plan Inventory and Assessment – Meeting Schedule

Mr. Cope provided a brief summary of the status of this Inventory and Assessment. He said the City has hired URS Woodward-Clyde as a consulting team for this project. He provided an overview of the meeting schedule, and stated that at the first meeting, there was little attendance; however, at the Arroyo Burro Creek meeting there was a large turn out. He further said the Mission Creek meeting was well-attended.

Commissioner Baum asked if the Lower Mission Creek project ends at Cabrillo Boulevard. Mr. Cope said yes but that staff is looking at the beach area in terms of (SEE TAPE)

c. Commission Projects and Priorities

Mr. Johns suggested that he meet with a Commissioner with respect to these projects and priorities. He said we could discuss this and report back to the Commission in February.

Chair Hughes encouraged each Commissioner to contact Mr. Johns to discuss this matter.

Commissioner Longstreet said the presentations regarding the grant were helpful and applied to Families and Healthy Living – a goal.

d. Commission tour Schedule 2000

Mr. Johns highlighted the schedule and said the recommended schedule rounded out the department include both recreation and park areas.

Chair Hughes expressed interest in having tours of the soccer fields listed in the inventory as we get into the soccer issue.

Mr. Johns said he would try to set up some dates for the next meeting.

Mr. Johns advised the Commission that this meeting was Ms. Carrillo-Walker's last Commission Meeting and provided notice of her going away party. Mr. Johns highlighted Ms. Carrillo-Walker's service to the City and the positive impact she has had on the services and programs provided by the Department. He expressed his appreciation for her dedication, commitment and acknowledged the contribution she made to the Department and the City of Santa Barbara.

Chair Hughes echoed Mr. Johns comments. She expressed the Commissions appreciation for the quiet, calming affect she had on the Commission, and thanked her for her contribution.

Ms. Carrillo-Walker responded by thanking Mr. Johns and the Commission for the support they have provided to her and her staff.

21.
NEW BUSINESS
a. Elings Park Foundation Annual Report

Mr. Johns introduced Joan Russell, Executive Director, Elings Park Foundation. He said that the Commission requested this report.

Ms. Russell provided a brief history of the Elings Park Foundation. Gift of 10 million dollars to the City, not purchased with tax dollars. She said it consists of 230 acres. She said it is home to BMX, hang gliders, dogs off-leash, and (SEE TAPE).

Chair Hughes asked re: Dec 98 financial form $500,000 note. She asked if it was paid off. Ms. Russell said yes.

She further stated that they realized a good financial year in 1999 and asked if they have financial flexibility now (SEE

	12. ADJOURNMENT	At 8:10 p.m., there being no further business to come before the Commission, **Commissioner Longstreet moved, , seconded by Commissioner Commissioner Baum and passed 5/0 that the meeting be adjourned.** Respectfully submitted, Richard C. Johns Parks and Recreation Director	

Com#9-1

To: Army Corps of Engineers, Attn: Ed Demesa 1-21-2000
Subject: Lower Mission Creek--Flood Control Feasibility Study
This project, which is way overdue, should proceed in a way that will have the least impact on our taxes in the long run and provide the best safety for the citizens of Santa Barbara. Creekside plantings should hold the last place of importance for any project design considerations.
Often the highest costs are the after construction maintenance costs and policing problems.
We feel that the project should be extended to the upper end of Oak Park, past De La Vina, Alamar and State Street.
Our first proposal is to enclose the creek in a concrete structure which would form a rectangular shaped pipe. At State and Cabrillo, the pipe would be recessed under water much as the sewer pipe is and the water from the creek would be released several hundred yards from the coast. The top of the structure would be covered and planted with trees and shrubs and a bicycle path through Santa Barbara to the ocean, or from the Mission to the ocean. The advantages of this approach are:
1. Eliminating a major eyesore and cesspool which presently runs throughout the city.
2. Eliminating all the bridgework since the roads would be paved over the "pipe".
3. Eliminate all the maintenance along the creek due to shrub and tree clearance from the open creek.
4. Reclaim hundreds of acres of land for new homes, businesses, parks and open space.
5. Eliminate the homeless and safety problems with those that presently live under the bridges and in the creeks.
6. Eliminate the tepid pool of water at State and Cabrillo.
7. Provide a bike path through the city without condemning new land.
8. Eliminate the safety problems of property damage and loss of life during flooding conditions.
Our alternate proposal is to line the creek with concrete, and widen it. Place a bicycle path along each side and low shrubs along the bicycle path. The bicycle paths would go under the bridges. Plantings which could cause congestion in the creek would not be placed near the creek.
The advantages of this proposal are:
1. Some people may like it better.
2. Remove the eyesore of the present creek.
3. Provide a bikepath without condemning new land.
4. Keep plantings away from the creek so maintenance costs will be minimized over the years.
We are totally opposed to the suggestions in your flier. They do not solve any of the problems which the creek presently has and the maintenance and safety costs will continue to be high. From a taxpayers efficiency point of view, this is NOT the way to go! The creek will still be a cesspool and an eyesore but a more expensive one!
Concerned Taxpayers INC
Justin M. Ruhge, President P.O.Box 8216 Goleta, CA 93118 805-7379536

Responses to the comments from:

Concerned Taxpayers Inc.
Justin M. Ruhge, President
P.O. Box 8216
Goleta, Ca 93118
805-737-9536

9-1 The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciate your comments which are vital to the success of this flood control project.

Your suggestion to either enclose the creek in a concrete structure or line the creek with concrete to increase the conveyance capacity is somewhat similar to earlier flood control designs developed during earlier studies for this creek. Earlier proposals were either rejected locally or were too expensive. In the case of the concrete lined channel, technical issues would have to be overcome in order to convey sediment laden stormwater flows. The proposed solution to this technical issue would involve building additional sediment basins upstream of the project reach (sites considered included debris basins at Rocky Nook and Oak Parks). Based on earlier efforts, there is strong opposition to building any such basins.

Your proposal to enclose the creek in a culvert and extend a pipeline into the ocean would be extremely expensive. This approach would be very unlikely to meet the cost-benefit criteria used by the Corps. In addition, since the last Corps study, the tidewater goby has been found to be present in the lagoon and the estuary near the mouth of Mission Creek. Also, the National Marine Fisheries Service has identified this creek as a periodic migratory corridor for

		the Southern California Evolutionary Steelhead. Both species are listed as endangered. In consideration of the Endangered Species Act, the alternatives formulated during this feasibility study were designed to maintain the existing natural creek bottom and, as further enhancement, hardened sections of the creek bottom will be restored to natural conditions. In accordance with Federal requirements, this project has been found to be economically viable. The expected benefits derived from the increase in the level of flood protection and the inherent environmental outputs of the flood control design features and their appurtenances will exceed the cost of building and maintaining this project by roughly 20 percent, making it economically justified according to appropriate Federal guidelines.

SANTA BARBARA BICYCLE COALITION

Robert Bernstein
448 Mills Way #B
Goleta, CA 93117
(805) 685-1283
Email:rdb@silcom.com

Digital Instruments Inc
112 Robin Hill Road
Santa Barbara, CA 93117
(805) 967-2700 x239
(805) 967-7717 FAX

February 5, 2000

RECEIV
FEB 07 2
CITY OF SANTA B
PLANNING DIV

Jan Hubbell
Project Planner
Planning Division
City of Santa Barbara
P.O. Box 1990
Santa Barbara, CA 93102-1990

I am writing regarding the plans for restoration of Mission Creek both as an individual and as the president of the Santa Barbara Bicycle Coalition.

Com.#10-1 As an individual, I would like to give my enthusiastic support to any plans to restore Mission Creek to be a thriving habitat for wildlife. I grew up in the East and had never seen a paved creek until I came to Santa Barbara. In the East, where rain is a year-round expectation, there is a recognition that water needs a place to go. And that means that you respect creek areas and don't build near them.

From that practical consideration, urban creek areas in the East are natural linear park areas. In Washington, DC where I mostly grew up, Rock Creek Park is a perfect example. It is a place where families can have a picnic and yet it is also a place right in the heart of the city where wildlife can thrive. And children grow up seeing those natural habitats with an easy walk, bike ride or short bus ride.

Leaving creek areas as natural linear parks provides natural interconnected habitat areas which is crucial to wildlife survival. It is not just the size of the habitat that matters, but also the fact that it allows free wildlife movement along interconnected paths.

Com#10-2 I now wish to speak as the president of the Santa Barbara Bicycle Coalition. The plans to restore Mission Creek to a natural area is consistent with providing a bicycle path which follows the creek. Again, the creek areas I grew up with in Washington, DC and in Boston always had trails for hiking and bicycling along them.

Any plans to restore Mission Creek must include trails for bicycling. This is an opportunity that will not come again.

Com#10-3 As an individual and as Bicycle Coalition president, I am excited to see the vision of a restored Mission Creek that serves as both natural habitat and as natural recreation for local residents.

Sincerely,

Robert Bernstein

Responses to the comments from:

SB Bicycle Coalition
Robert Bernstein
488 Mills Way #B
Goleta, Ca 93117
805-685-1283

10-1 Thank you for your comment. Comment acknowledged.

10-2 See response to comment 6-4. Similarly, this would apply to your suggestion regarding the bike path.

10-3 The restored creek will include riparian corridor along the banks. Also, some type of recreational feature would be included in the habitat expansion areas as embellishment paid for by the City.

De La Guerra Square Homeowners Association
314 C. West De la Guerra
Santa Barbara, CA 93101

RECEIVED
FEB 09 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

Jan Hubbell
c/o Lower Mission Creek Flood Control Project
Planning Division
PO Box 1990
Santa Barbara, CA 93102

February 7, 2000

Dear Jan:

As representative of De La Guerra Square Homeowners Association, I am writing to express the Associations support for the current iteration of improvement for Mission Creek.

Com.#11-1 The Association wholeheartedly supports the project, as it will reduce the potential for flooding along the length of the creek. Furthermore, the Association supports the preferred project's recommendation for bank treatments in the vicinity of our property. We encourage the City to acquire properties along the upper creek that provide for expanded wildlife enhancements and neighborhood enhancements. Hopefully, the mature Sycamore trees and mature Canary Island palms in our area will be protected during the project and not be destroyed. We encourage the City to supplement the Core of Engineer's project with addition trees and plantings. These proposed green areas would enhance the livability of this neighborhood.

Com.#11-2 Lastly, the Board of Directors would like to inquire as to nature of the acquisition of any further easements and or property rights by the regional flood control agency that may affect the valuation of our parcel that currently crosses the creek. Please inform us of any further easements or takings that may affect the value of our property.

Thank you for your consideration.

Sincerely,

Edward Cella, President
De La Guerra Homeowners Association
Writing on behalf of:

Lance R. Ignon
Jack Barnard
Genevamae Bauer
Ann Bryant
Vijay and Tricia Kapur
Charles Tob Plough
Francine and Michael Rand

Responses to the comments from:

De la Guerra Square Homeowners Assn.
314 C. West De la Guerra
Santa Barbara, CA 93101

11-1 The project includes features to restore the riparian corridor along much of the project reach. Additionally, expanded habitat areas with recreational features will be created that would add to the enhancement of nearby neighborhood. The project proposes to create a special design in order to save the Sycamore tree next to the De la Guerra Bridge. We do not anticipate any impacts to the Palm trees located on the sidewalk or elsewhere nearby. In addition, the City is pursuing a program to provide native trees and other plants to property owners along Mission Creek to further expand the riparian forest and improve aesthetics.

11-2 The City and the County would be notifying property owners during acquisition of the affected properties.

Santa Barbara Audubon Society, Inc.
A Chapter of the National Audubon Society

5679 Hollister Avenue, Suite 5B, Goleta, CA 93117 (805) 964-1468

February 8, 2000

RECEIVED
FEB 08 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

Janice Hubbell, Project Planner
City of Santa Barbara
PO Box 1990
Santa Barbara, CA. 93102

Dear Ms. Hubbell,

On behalf of the Santa Barbara Audubon Society, we thank you for the opportunity to review the December 1999 Mission Creek Flood Control Feasibility Study and to give both our verbal (at the public hearing on 19 Jan, 2000) and these written comments regarding the study. We concur that Alternative 12 is the best of those presented, but we would like to voice our concerns about several issues, and suggest alterations to the plan in specific instances.

The format of each section of comment will be as follows: We will list one or two goals for the project, as stated in the Feasibility Study, and then discuss why we think these goals are not fully achievable under current conditions of the proposed project. We will suggest alternative strategies which we believe, if adopted, will increase the probability of successfully reaching these goals. A summary sentence at the end of each section will serve as our opinion and suggestion "in a nutshell".

Comm 12-1

Project Boundaries

First, we would like to challenge the downstream "boundary" of the proposed project. As the project boundaries are currently delineated, the *project* ends just short of where the *creek* ends -- plans for improvements terminate at Cabrillo Blvd., and fail to include the mouth of the creek and beach area, where the creek flows into the Pacific. One of the goals of the project, as are stated in the Study, is to increase the flood capacity of the creek. We believe that in order to successfully reach both of these goals, the project must be extended to include the entire creek -- all the way to the Pacific. While the flood capacity of the mouth and Cabrillo bridge may be adequate, for maintenance purposes, the mouth of the creek must be included in the project area. Due to potential increased sediment deposits at the mouth of the creek (no one *really* knows how the new stream design will affect downstream sediment deposition), the pattern of channel obstruction and breaching could be altered, leading to decreased flood capacity in the event of heavy rains. In addition, the channel on the ocean-side of Cabrillo directly influences -- and is influenced by -- the estuary just upstream; the tidewater goby is known to inhabit the estuary and could suffer adverse effects (due to altered salinity, water temperature, turbidity, or a build-up of toxins in the water) if the lagoon characteristics are significantly altered. We ask you to please refer to the California Coastal Act, Section 30231 (p. 4-38 in the draft EIS/EIR) to help you make an informed decision regarding the importance of the project's responsibility for protecting biological productivity and water quality throughout the *entire* lower reach of the creek.

We feel that the project boundary should extend past Cabrillo Blvd. all the way to the Pacific in order to include the mouth of the creek in critical monitoring and maintenance plans.

Responses to the comments from:

Santa Barbara Audubon Society, Inc.
5679 Hollister Avenue, Suite 5B
Goleta, CA 93102

12-1 The presence of the Endangered Species in the lagoon limits the activities affecting this area. Based on information gathered from the Santa Barbara Waterfront Department and observation by the County Flood Control Staff, the sand plug is not seasonal, and is active year-round. The sand plug usually gets washed out during flows greater than typical low flows from Mission Creek. This was evident during the February 1998 flood event where the sand plug was washed away and did not have any impact on conveyance near the mouth of the creek. Instead, constrictions at the Railroad area forced the storm water to overflow and eventually flood the downstream areas. Additionally, see response to comment 1-4.

The biology section of the EIS/R has been updated to include evaluation for tidewater gobies in the lagoon. Most biologists believe that the lagoon could be a spawning area for the tidewater gobies.

12-2 Although the goals you have identified would have been desirable, specific planning objectives for this project include to:

- provide increased flood protection;
- restore the major species of a native riparian community along the project reach;

Comm 12-2

Creek Banks: Vertical Walls, Graduated Slopes, and Riparian Vegetation

Two more goals of the project, relevant to this topic of comment, are: 1) restoration of contiguous riparian habitat along the project reach, and 2) restoration and conservation of as many "natural stream processes" as possible.

Comm 12-3

We believe that goals #1 and #2 cannot be met with the many concrete vertical walls as are in the project plan at present. We are especially concerned about the City of Santa Barbara's recommended changes in order to preserve some of the historic structures–more vertical walls which were not in the Dec. '99 Study. These buildings which will be "saved" from flooding on average every five years, will be anything *but* saved, when a flood comes along which cannot be contained within the 3400cfs capacity of the creek! They would be flooded in a 25 year flood, 50 year flood, 100 year flood. The ecological conditions of the creek and the potential for restoration of natural stream processes are equally important, and each structure in the floodplain which is "saved" reduced the continuity of riparian vegetation and opportunity for expanded habitat areas. Therefore, we support The Environmental Defense Center's suggestion at the January 19th hearing that the $2.5 million which has been set aside by the City Redevelopment Agency to be used on Mission Creek should be used to supplement the appropriation of more property along the creek banks, freeing up more of the natural floodplain and allowing for both the widening of the creek, *and* construction of sloped, vegetated banks. This should be given serious consideration because it would decrease flooding problems by removing structures from the floodway and would facilitate restoration of the riparian corridor and natural stream and floodplain processes.

Comm 12-4

The Study tries to focus the reader's attention on the thousands of feet of sloped, vegetated banks which will be installed, while in effect, drawing attention away from the fact that *more than 1/3* of the creek will be lined with vertical concrete walls. Even with a natural creek bottom, vertical concrete walls will not allow critical natural stream processes -- such as the growth of native bank vegetation for canopy cover and creekside wildlife habitat, and improve habitat for *listed* steelhead trout, as well as biofiltration of the creek waters -- to occur. In the estuary area -- a known habitat of the tidewater goby -- sloped, vegetated banks are critical on at least one side.

Comm 12-5

Regarding the first goal, above, we also would like to comment on the plan for the placement of one canopy tree every 40 feet along the banks of the stream. We understand that a space can be made in the riprap and concrete foundation of the short wall lining the creek only every 40 feet -- due to issues of stability. However, the suggested cover of canopy trees, understory trees and shrubs, and groundcover are inadequate. We would like to recommend that additional canopy trees be planted (perhaps in less systematic groupings) closer to the tops of the banks, underneath which the foundation of the wall does not extend -- thereby avoiding that engineering constraint and creating a more lush, contiguous riparian environment. We also would like to suggest that an alternative be considered to the concrete cylinders which were proposed as "place-holders" in the riprap and which would serve as "planters" for the trees. *Cardboard form tubes* used in the making of large cement pipes should be evaluated; the heavy wall tubes may be sturdy enough to serve as place-holders, the trees roots would have a much easier time of breaking through thick cardboard than cement as they grew, and the cardboard would eventually break down into fibers which would be incorporated into the soil.

- move and suppress invasive non-native vegetation and replace with native plants;
  - move man made construction materials along the creek bottom and restore to natural creek; and enhance the aquatic habitat by changing the streambed characteristics.

12-3 City of Santa Barbara has undertaken a Clean Water and Creek Restoration Program. This program includes a complete re-evaluation of the existing City creek-related policies and ordinances. One of the items under consideration is an increase in creek setback requirements that will prevent new construction within the setback and, over time, prevent reconstruction of structures that exist within the setback area. Such a policy may include transfer of the lost units to other properties in the area. These changes to City policies and ordinances will be considered as part of the larger program. We encourage your participation in that process.

In order to maintain Federal participation based on the project cost-benefit analysis, additional buildings were saved in place to reduce the cost of real estate acquisition. If the $2.5 million set aside to increase native plantings, enhance the habitat expansion zones, provide interpretive signing and improve the appearance of bridges is used to purchase property, it will not be possible to provide the other proposed embellishments. City policies to project historic resources must also be met, where possible.

Comm 12-6

Lastly, also on the subject of canopy trees, we are confused by the arithmetic which was used to calculate the minimum number of trees needed to line the creeksides. If one tree will be placed every 40 feet along both sides of the creek for the 1.2 mile (6336 foot) stretch of the project, then 158 trees (6336/40) will be needed to line one side of the creek -- **316 trees to *minimally* cover both sides**; the Study states that "105 at a minimum" will be needed to line the "sloped stream banks". The Study then goes on to require 210 trees for "habitat expansion zones" -- which sounds reasonable, until further reading reveals an estimate of 80 survivors from those **original 210** by the end of 5 years. Why will the trees in these "expansion zones" not be replaced as they die, as is the plan for those along the banks? If the project truly is aiming for a "contiguous canopy" of trees in a healthy riparian habitat, we need to plant (and initially maintain) a ***minimum* of 526 canopy trees** along the reach of this project.

Comm 12-7

So, in order to create and preserve a healthy riparian habitat and natural stream processes, the project needs to reduce the number of vertical concrete walls (consequently increasing the amount of vegetated slope) and increase the number (and vary the placement) of canopy trees planted, considering the use of cardboard forms instead of concrete cylinders as planters.

Maintenance

The goal we would like to focus on in this section is: to maintain the creek channel for flood-preparedness while preserving as much of the creek's natural/ecological integrity as possible.

Unfortunately, we were not able to compare the proposed maintenance plan to the goal stated above, because *there was no proposed maintenance plan included in the EIS/EIR*. Though we were told of the recent formulation (and initial discussions) of a Maintenance Committee at the January 19th hearing, we want to impress upon you that the eventual plan for creek maintenance needs to be as carefully thought out as the rest of the project -- as the maintenance of the stream will effect every aspect of the completed project. We realize that some of the following issues may have already arisen in the discussions of the Maintenance Committee, but we will mention our concerns here to insure that they are addressed.

Comm 12-8

The EIS/EIR suggested vaguely in several places that maintenance of the completed project would occur essentially as it is conducted presently; we would like to propose some alterations to that plan. First, we recommend consideration of a *flexible threshold for silt removal* -- instead of the fixed, low 15% threshold, as stated in the feasibility study -- to stress the importance of a minimal/only-when-necessary plan, as opposed to a frequent/routine plan. Silt build-up can be monitored annually or semi-annually, and plans can be made to clear the channel when the accumulation is deemed too obstructive. We feel it is crucial that the maintenance plan focus on *silt* removal, and *not* the removal of *vegetation*, as scraping the entire creek bottom clear of all vegetation not only will reduce biofiltration benefits to the creek, but has the potential to severely disrupt the habitat of the tidewater goby and steelhead trout (in addition to other organisms using the bottom vegetation). If some plants must be removed in order to clear away silt accumulations, we propose that the maintenance crew clear the channel bottom in a *mosaic pattern*, leaving scattered, undisturbed areas to provide propagules for regrowth in the disturbed areas. We also suggest that any naturally-formed pools or riffles be left alone during maintenance (and not filled in with silt from other sites of accumulation), so that the biota of the creek may continue to benefit from the variation of microhabitat they provide.

This study shows that the 3400-cfs design would result in reduction of flooding from higher but infrequent events. The effects of flooding from higher flows are shown on the inundation maps found near the end of the main report. The map shows the reduction in flooding for the 50, 100, and 500-year floods.

12-4 The project anticipates some reduction in the amount of hardened banks as they are replaced with the toe wall and vegetated riprap slope banks. In some places, full height vertical walls are needed to avoid additional property acquisition.

See response to comment 12-2. Additionally, the existing hardened banks already impair the critical natural stream processes. It is expected that the growth of vegetation along the banks and in the expansion habitat areas will increase canopy cover and improve creek side wildlife habitat.

We anticipate overall improvements of stream conditions that are important to the migration of steelhead. These improvements include features such as soft bottom, boulder fields as energy dissipaters, and eventually more shade throughout the creek. A combination toe wall and vegetated riprap slope for a section just below Mason Street Bridge is already part of the project design.

12-5 The placement of the trees will be varied between the last six feet from the back of the riprap slope. The interval of 40 feet between canopy trees could be reduced; however, the local sponsors would share the expected additional costs. A typical mature sycamore tree would have a canopy that exceeds a radius of 20 feet.

Comm 12-9 The project plan (Alternative 12) calls for "energy dissipators" in the form of collections of boulders embedded in strategic places along the bottom of the creek, to slow down rushing currents and redistribute their energy into riffles and swirls. We are in support of these "energy dissipators" and the microhabitat alterations they will provide, however, maintenance of these boulder fields, as stated in the EIS/EIR, will include removal of all trees and herbaceous plants which become established among the rocks (the reason stated is that vegetation would encourage sediment build-up). It seems as though sediment accumulation in these areas would be caused mainly by the boulder fields, themselves, and not any plants which may be among them. Some canopy trees should be allowed to establish in the creek channel, which can be "limbed up" to reduce roughness; these are important in such a wide creek (as this will be, when the project is completed), providing critical shade for the creek waters, to help regulate water temperatures, discourage growth of harmful bacteria, and *reduce the growth of willows*, (which can be obstructive vegetation in the active channel).

Comm 12-10 The maintenance plan should be similar to Santa Barbara County Flood Control's Annual Maintenance Plan, in that it should be subject to the Programmatic EIR as it is updated over time. This was alluded to by Karl Treiberg at the hearing, but the EIR suggested that this initial Environmental Impact Study would serve for maintenance, and that the Mission Creek Maintenance Plan would not be subject to further review. This would not be feasible, since the maintenance plan is not complete, and not presented in the EIR. We support inclusion of Ann Riley's recommendations for development of the maintenance plan.

Comm 12-11 We propose that the project emphasize minimal maintenance (with a flexible threshold for silt removal and a focus upon *silt* removal, as opposed to the removal of *vegetation*), using a mosaic pattern for clearing the bottom, and allowing at least some canopy trees which establish themselves among the boulders of the "energy dissipators" to grow without being disturbed. The maintenance plan must be subject to the Program EIR. Maintenance is as crucial as every other part of the project.

Widening of the Estuary

Not only will the project activities in the estuary focus on increased flood capacity, but they must be guided by the need to protect and restore this known habitat for the endangered Tidewater goby.

Comm 12-12 The wording of the EIS/EIR is such that one of the reasons given for widening the estuary area from 15/30 feet to 60 feet is to "increase goby habitat area". A larger area of natural mud bottom (and its associated bottom-dwelling plants) upon which to forage may, indeed, temporarily benefit the goby, but over the long term -- particularly in the event of a flood of any magnitude -- the goby is likely to suffer with the proposed widening of the estuary. As discussed above, in the "Concrete Walls..." section, the estuary area is slated to be confined by vertical, concrete walls along its entire stretch. As Kevin Lafferty, a local expert on Tidewater goby ecology, has informed us (personal communication, 2 Feb 2000), the goby requires bank vegetation in which to seek shelter when fast-moving flood waters rush through the channel, or else they will be swept up and washed out to the Pacific and their deaths. Vertical walls will provide no protection against rushing flood waters, and the goby population could potentially be greatly reduced. If a 50' estuary width can be considered instead of 60', then there should be space for a vegetated bank on the east side. The Tidewater goby habitat and survival *cannot* be degraded by the project, and should be improved. A wider swath of "natural creek bottom" is not likely to benefit the goby if the bank vegetation, which it uses for cover and as a refuge during flood events, is absent. In fact, the widening of this area and combined construction of vertical, concrete walls in place of sloped, vegetated banks *will* negatively affect the

The design already includes the maximum amount of understory and ground cover. The additional purpose of the concrete cylinders aside from being a planter is to augment the riprap that would otherwise support and keep the integrity of the riprap slope. Cardboard form tubes, if found structurally adequate, could be considered.

12-6 Based on the amount of plantable areas (not including those areas with full-height vertical walls), canopy trees will be planted on a 40-feet spacing along the vegetated riprap slope. At a minimum, 115 trees will be planted in the five habitat expansion areas. If possible, canopy forming trees will be planted closer to all for more. Based on project standards, the number of trees expected to be alive after five years would be at least 85 percent of the initial number of trees. This information is found in the biology section of the EIS/EIR.

12-7 See responses to 12-2 through 12-6. Additionally, the existing hardened banks already impair the critical natural stream processes. It is expected that the growth of vegetation along the banks and in the expansion habitat areas will increase canopy cover and improve creek side wildlife habitat.

12-8 Your recommendation has been taken into consideration. The maintenance plan identified in the EIS/R has been revised. The new proposed maintenance plan is to clear half of the creek bottom on a mosaic pattern every year to allow growth of non-obstructive vegetation in the creek bottom. However, the entire creek bottom would be cleared and returned to its design and form when wet season is anticipated. The periodic maintenance activities will be scheduled at specific time of the year to avoid impacts to Endangered Species.

gobies and their habitat. Please reference the Tidewater Goby Biological Assessment (top of p. 12), for further support of this statement, as given by the Corps of Engineers, themselves. Do not allow the "lack of experimental data" and the consequential ignorance of any "significant effect" to serve as permission to impact the estuary and its gobies so severely. This may be an area where the proposed development cannot occur and meet the requirements of flood control and mandated protection of the listed tidewater goby.

Comm 12-13 We propose that the estuary section of Mission Creek to be redesigned to include sloped, vegetated banks (*not* vertical, concrete walls) on at least one side, which will provide critical microhabitat for the Tidewater goby.

Wetland Construction

The goal is to construct an expanded area contiguous with the creek at the oxbow bend where wetland flora and fauna can thrive, and where critical biofiltration of the creek's water can occur.

Comm 12-14 The addition of a wetland section to Mission Creek would be a great benefit to all involved, and we strongly support its inclusion in the project; our concern here is whether it will actually be built. The wording of the EIS/EIR suggests that the construction of the wetland will depend upon the successful clean-up of soil contamination on the site. We would like to know who is responsible for coordinating this de-contamination effort (City, County, Army Corps, ...), and whether it could feasibly be completed in time for the projected construction of the wetland. If the area cannot be decontaminated by the time the project is completed, will the wetland be created at a later date, or will it be forgotten and left out of the project? Are there plans in place for how to deal with the area slated for the wetland if it cannot be constructed? Will there be ecological mitigation elsewhere in the city or county to replace what could have been gained by building a wetland at this site?

We are also concerned by the statement at the bottom of page 4-37 of the EIS/EIR reading, "...there may be an inadequate buffer for habitat purposes at the top of the bank". What, exactly, does this mean? This statement seems to imply that the plans for the wetland construction are not completely worked out, and that perhaps it would not be ecologically feasible to create a wetland at this site. We hope that the proper research can be undertaken to accurately determine whether this potentially beneficial part of the project will be able to be included in the construction plans.

Comm 12-16 Several passages in the draft EIS/EIR regarding the possibility that the wetland planned between Gutierrez St. and Hwy 101 may not be built concern us, and we ask that further research be conducted to explore likely outcomes, and the results be detailed in the final document.

It should be noted that, if vegetation is allowed to grow in the stream bed for more than one to two years, it will be necessary, under both State and Federal law, to mitigate the loss of habitat that results from its necessary removal to preserve creek capacity.

The project design included a streamlined creek bed. Pools and ripples created by scouring will be filled in to maintain the design and form of the project. However, three bolder fields are included in the project design. These will form ripples.

12-9 Vegetation within the creek bed will be mowed in a mosaic pattern for the future maintenance. Shade study has been performed to analyze growth of vegetation and shade created by the growth of vegetation. Within 5-7 years vegetation would reach a height of approximately 10 feet which would provide shading for the creek bottom. See appendix A (Shade Study) for details.

12-10 The initial permit for project maintenance will be good for ten (10) years and incorporates the mitigation requirements from the Programmatic EIR by reference. However, proposed maintenance for any particular year will be included in the Annual Maintenance Plan.

12-11 See responses to comments 12-8 through 12-10.

Water Quality

Unfortunately -- as we pointed out at the January 19th hearing -- the Plan did not specifically address the critical issue of water quality in Mission Creek. The most fundamental goals would be to improve the current polluted state of the creek's waters, and at the very least, to not allow the problem to worsen. Only short-term, construction-related water quality issues are addressed in the EIR.

We have already discussed -- in other sections of these comments -- biofiltration measures which should be implemented to *improve* water quality in the creek: vegetation growing in the creek bottom and among the boulders of the "energy dissipaters" and vegetation along the sloped banks of the stream should be encouraged to act as biofilters and sources of shade. In addition to these "natural" cleaning methods, we also recommend that filters be installed on all storm drain outputs into the creek in the project area, to *prevent* a great deal of pollution from entering the creek in the first place. Grates should be installed to catch large trash items, and the installation of oil/grease traps would protect the creek from runoff containing road-based toxins, which flow into storm drains at particularly high concentrations after the first storm of each season.

The issue of water quality in Mission Creek is a critical one; it should be a very high priority of the Project, especially given the history of this creek's contribution to beach closures due to high levels of toxins carried downstream to the Pacific. We urge you to recognize the importance and potential of biofiltration to *improve* water quality, and of filters at drain outlets to *protect* it.

Summary

As a local conservation organization, Santa Barbara Audubon is concerned about the ecological integrity not only of the Santa Barbara area, but of the entire South Coast. We have taken this opportunity to make comments on a plan which will ultimately affect us locally, and hopefully -- when it is complete -- serve as a precedent regionally. We believe the design for this project is significantly improved upon designs submitted in past reviews, but that it is in need of more work. We hope you will carefully consider our comments and the final Mission Creek Flood Control Project will be better for inclusion of some of our recommendations.

Thank You,

Darlene Chirman

Darlene Chirman
President, SB Audubon Society

and

KRadasky

Kendy Radasky
Conservation Intern, SB Audubon Society

Copies:
Jill Zachary, Planner, City of Santa Barbara
Brian Trautwein, EDC

12-12 The USACOE believes that widening of estuary would not have adverse impact on tidewater goby, during construction short-term temporary impacts may occur. Mitigation measures have been developed to minimize impacts related to project construction to tidewater gobies. No future maintenance would be performed within this reach of the project area. In existing condition the creek banks partially stabilized by a vertical wall.

12-13 See response to comment 12-12.

12-14 See response to comment 1-2. In addition, the owner of the property, the California Department of Transportation, is responsible for site clean-up. It is unclear if decontamination can be completed. However, it is the intent to pursue this project.

12-15 See response to comment 1-2.

		12-16 Water quality along Mission Creek and other creeks in the City is being handled by looking at the entire creek. Mission Creek was studied as part of the South Coast Watershed Characterization Study, completed in August 1999. That study concluded that, for Mission Creek, bacteria are the principal pollutants of concern. As you indicated, much of the upper watershed has acceptable levels of bacteria. It appears that storm drains and creek encampments are probable sources of high bacteria levels in the middle part of the watershed. In the lower part of the watershed, storm drains and lagoon fauna, such as birds, are probable sources of high bacteria levels. Subsequent investigations by the City have confirmed that encampments in the lower watershed are primarily source of high bacteria levels. In addition, Old Mission Creek, the abandoned former channel of Mission Creek, West of Highway 101, is also a significant contributor to elevated bacteria levels below its confluence with Mission Creek's main channel.
		The City and County of Santa Barbara are working cooperatively to clean up local creeks, although because most of Mission Creek's problem areas are within the City, the city is taking the lead. However, the cooperative public education and information program is a joint effort that is key to gaining public improvements necessary to improve Mission creek water quality. Both the Creek Strategic Planning Process (See Response to Comment 12-3) and the Clean Water and Creek Restoration Program should result in improvements to Mission Creek water quality. Elements of the Program include: monitoring water quality, especially "hot spots;" increased enforcemen[illegible] City

		ordinances prohibiting contaminated water discharges; public information and education, municipal government good housekeeping; increase clean-up of catch basins and creeks; removal of illegal encampments in creek corridors; and enhanced street sweeping. The City is also investigating a pilot project for installation of one or more storm water interceptors for storm drains that flow into Lower Mission Creek. In addition, the City will be pursuing installation of catch basin filters in the State street commercial area (which drains to Mission Creek) and clean-up of Old Mission Creek hotspots. Construction of the flood control project will not inhibit these efforts. 12-17 See response to comment 12-16. 12-18 See response to comment 12-17. The Corps of Engineers authority in this flood control project does not allow direct participation in water quality improvement measures. Although it may have minimum effect, the current re-vegetation of the creek banks and the creation of habitat expansion areas may provide a natural cleaning opportunity as surface flows cross these areas.

Cmt#13-1

8/2/00

Dear Santa Barbara Mayor & Councilmembers, and the Concrete Corps of Engineers;
RE: MISSION CREEK DETOURS

The fictional, fancial, and fraudulent Draft Main Report & Environmental Impact Statement/Environmental Impact Report (EIR; Clearinghouse Publication No. 93101061; dated December 1999) contains the usual Baldergash and Big Lies concocted to justify and promote the project under review - this one being the Lower Mission Creek Flood Control Project in Santa Barbara, California proposed by the Concrete Corps of Engineers (CCE) and the City Hall Gang.

There is NO reason why any member of the public should waste time and money analyzing this 2½" thick tome because the Bureaucrats and Politicians have already, with malice aforethought, decided to ram Alternate 12 down the taxpaying suckers' throats before the document was completed. Why waste the taxpayers' money compiling any EIR - except as a pork barrel, makework, waste money exercise to occupy numerous overpaid Bureaucrats?

Besides the corrupt, incompetent, carpetbagging City Hall Criminals cannot construct a dog house! They SCREW UP everything they attack at enormous cost! Some recent debacles include: $11,500,000 destroying the Railroad Station and wrecking the Depot and Fig Tree Landmarks; $70,000,000 wasted on the badly designed and conceived Downtown 101 Wasteway - complete with wonderful State and Garden Swimming Pools; $35,000,000 wasted on the unneeded and unused Desalinization Plant, now being given away; $6,000,000 wasted on unneeded new brick sidewalks and landscaping for downtown State Street (there are miles of city streets with no or deteriorated sidewalks!); $4,000,000 wasted on the Milpas Bridlock - About; endless millions of dollars wasted on endless pork barrel, makework, waste money scams each year to pay off the favored City Hall Plumbers and Contractors who in turn kick back to the City Hall Carpetbaggers mismanaging the publics' interests; ad nauseam.

The Concrete Corps of Engineers, another out-of-control, overpaid Bureaucratic Gang no doubt being paid off by the Cement Industry and assorted parasitic Contractors to pave over the Planet with Concrete unless derailed by the public, have proved in thousands of instances (i.e. Mississippi and Los Angeles Rivers Debacles) to be destructive, anti-environmental maniacs running amok with too much money to play with and no sense whatever.

These Government Debacles prove the cogency of Mark Twain's trenchant, brilliant, immortal analysis of government in his or any age: POLITICIANS (AND BUREAUCRATS) ARE AMERICA'S ONLY NATIVE CRIMINAL CLASS! How true! The only solution is to CUT OFF THE MONEY and let the Criminals Starve!

The City Hall Criminals refused to provide the undersigned with a copy of this EIR - raising the suspicion that they have something to hide. The non-contents of this inadequate, incomplete, erroneous, illegal EIR reveals that the rats are hiding plenty about this badly conceived and designed Fiasco in violation of the National Environmental Policy and Historic Preservation Acts (NEPA & NHPA) and the California Environmental Policy Act (CEQA) and common sense. This analysis relates to the Railroad Station and Fig Tree attacks caused by their relationship to Mission Creek. Time precludes complete exposes of every element of the project:

Responses to the comments from:

Richard A. Stromme
Railroad Advocates
PO Box 162
Santa Ynez, CA 93460
805-688-3145

13-1 Comment acknowledged. The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area a higher level of flood protection and improve the riparian community along the creek. Copies of the Draft EIS/EIR are, and have been, available for loan or review on site at the City of Santa Barbara Planning Division office and the main City Library.

13-2 Killing the Fig Tree. The alignment of the box culvert was selected to be as far away from the Fig Tree as possible in order to minimize potential impacts to the root system. Based on the investigations conducted by the Corps and the City, the box culvert will be outside the area utilized by the main root system of the Fig

Cmt#13-2 A) KILLING OFF THE FIG TREE. One of the goals preoccupying the City Hall Criminals is killing or damaging the Fig Tree – another source of "problems." The proposed box culvert for Alternatives 8-12 mislocated only 50' from the Fig Tree's dripline (40-45' during construction) will destroy major portions of this arboreal monument's root structure which extends over 100' from the dripline into the irrigated lawn area. There is at least one 6"-8" diameter root in this area and no doubt numerous other roots. The Big lie concocted by the lying Bureaucrats is that the culvert will not impact the Tree (75/2, 18-21/1; 99/2; refers to page/paragraph of the EER). Yet the Bureaucrats admit "temporary impacts" during construction will occur (Table 26/d). What are they?

Cmt#13-3 B) PLUGGING THE BOX CULVERT. The badly designed 350'-long, 6'x36'-wide, trigantate box culvert will become clogged with debris during floods (99/2, 102/3). Naturally, the Bureaucrats ignore this issue! Just as they do not inform the analyst how this 6'-high plugged culvert will be cleaned out. A plugged culvert will only "create" more flooding! Here is another "problem" which only the Bureaucrats can "solve"! How many "Cures" will be living in the cozy culvert?

Cmt#13-4 C) THE RAILROAD BRIDGE. The Bureaucrats do not mention the historic significance of Southern Pacific's (SP) three-track railroad bridge across Mission Creek which will be unnecessarily destroyed by Alternatives 3-7.

Cmt#13-5 D) THE MISSION CREEK CHANNEL. The sandstone walls of the Mission Creek Channel constructed by SP around 1905 are in perfect condition in contrast to the deteriorated state reinforced concrete would now be in, "proving" the efficacy of planned obsolescence. These walls will be partially or entirely destroyed with Alternatives 2-12 and no doubt replaced by weak reinforced concrete (76/4,5). Elsewhere, the Bureaucrats propose to move the south wall of the Channel 20' southward (61/1) or 25' (PLAN Alternatives 4-7). Which is it? The Bureaucrats also falsely claim that the 30'-wide Channel is 40' wide (61/2, 18-16/4). Better get out the tape measure fellows! Do the destructive Bureaucrats know what they are doing?

Any alteration of these historically significant sandstone walls which are an important element of the Railroad Station must be done with sandstone blocks. The locomotive boiler tube railing must also be rebuilt in kind. The Bureaucrats ignore the historic significance of the Channel (18-17/1).

Sandstone blocks must also be used in place of reinforced concrete elsewhere in the project for aesthetic and longevity reasons.

Cmt#13-6 E) COST/BENEFIT BALDERDASH. The Bureaucrats claim that the box culvert will cost $846,520 (TABLE 28/109). Let's round it off to $1,200,000! The Bureaucrats failed to inform the analyst about the costs of widening the Mission Creek Channel and the Railroad Bridge because they are so intent upon railroading Alternative 12 through the corrupt approval process. Nor do they tell us what the Railroad Detour and $174,000 (really $250,000) cost are all about. Nor do they reveal the circa $500,000 cost of destroying the recently planted concrete parking lot and train platforms on the Station site.

Cmt#13-7 F) STAGING DEBACLE. The Bureaucrats hunt to destroy the recently landscaped Station area at Chapala/Yanonali Streets is not acceptable (PLAN-Alternative 8).

Tree and is anticipated to have no impact to the health of the tree. The Corps plans to have a qualified arborist to monitor construction along this area and provide appropriate assistance if the root system is encountered.

13-3 Plugging the Box Culvert. The culvert has been redesigned into a pair of 15'X wide high 6' boxes in an effort to decrease the potential blockage by large debris. Furthermore, the splitter wall will be designed to a "bullnose" to help minimize the potential of getting debris trapped by this divider wall.

13-4 Railroad Bridge. The Recommended Plan (Alternative 12) will not require any work associated with the Railroad Bridge.

13-5 Mission Creek Channel. The new design included in the recommended plan will minimize loss of the sandstone walls along the railroad tracks. The box culvert will run alongside the sandstone wall and the Chapala Bridge, and will terminate at the downstream face of the bridge. This design will avoid any impacts to the sandstone wall along the railroad tracks.

Cmt#13-8

G) ALTERNATIVE 13. As the Bureaucrats and the City Hall Gang have botched the task of flowing Mission Creek through the Station property and SP screwed up in 1905 by failing to construct the Channel and Bridge twice as wide (50'-60') as they should have done, and suffered the consequences of numerous Station floodings over since, Alternative 13 is offered to save the Fig Tree and Station from mindless destruction and at no doubt lower cost.

Alternative 13 features the following elements (see enclosed Plan):

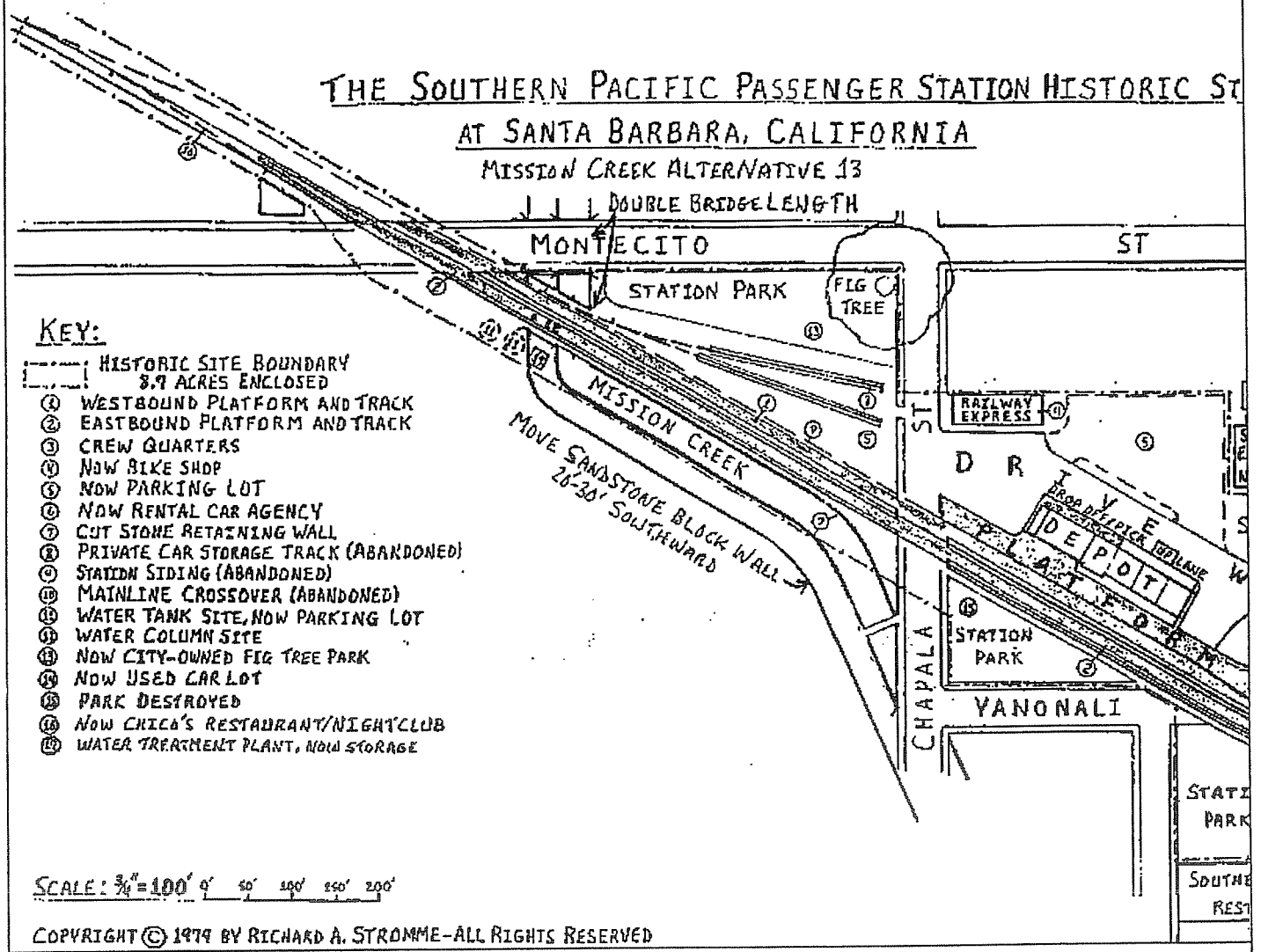
1) Move the south wall of the Channel 20'-30' southward retaining same block positions;
2) Move palm tree and Station Water Treatment Building westward (near Junkyard);
3) Double the length of the Railroad and Montecito Street Bridges (only one new pier needed);
4) Use new sandstone blocks for piers and longer wall sections;
5) Restore locomotive boiler tube railing across Mission Creek;
6) Plant large rocks on bed of Creek for more "natural" appearance.

For more information about this Debacle contact:
Richard A. Stromme
Railroad Advocates
P.O. Box 162
Santa Ynez, California 93460
Ph. 805-688-3145

13-6. Cost/Benefit. Your comment is duly noted.

13-7. Staging Debacle. The portion of Chapala Street fronting the tracks and the area that will be needed to build the box culvert will be used as the staging area to support construction activities below Highway 101. Impacts to landscaping in this area are anticipated.

13-8. Alternative 13. The features of your suggested Alternative 13 are similar to that of Alternatives 4-7 found in the report. Economic reasons precluded these alternatives from being recommended.



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RECEIVED
FEB 10 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

CPA

CITIZENS PLANNING ASSOCIATION OF SANTA BARBARA COUNTY, INC.

Attn: Janice M. Hubbell, Project Planner 2/8/2000
City of Santa Barbara Planning Division
Post Office Box 1990
Santa Barbara, CA 93102-1990

RE: Draft Main Report & EIS/EIR, December 1999, Santa Barbara County
Streams Lower Mission Creek Flood Control Feasibility Study

Dear Interested Parties:

Cmt#14-1 We wish to congratulate the City of Santa Barbara and the Army Corps of Engineers for putting forth a vastly improved project for the lower Mission Creek flood control area. We, as well as other members of the community, are pleased to see that the present plan is more environmentally sensitive and shows much more interested in the restoration and enhancement of the Creek itself. We appreciate the time and care that has gone into the "greening" of the project.

Cmt#14-2 We believe that additional project improvements can be gained from the changes that are being put forth by the public. We support a wider riparian corridor than the one that is currently proposed by the City and the Army Corps of Engineers. At a minimum, this proposal should create a long-term 50-foot-buffer zone from the top of the bank along Mission Creek which designates property within that zone as legal non-conforming. Within the buffer zone, the City should make use of the $2.5 million Redevelopment Agency funds as well as other available and prospective funds to remove or relocate structures located along the Creek. In determining which properties to remove from the buffer zone area, prime consideration should be given to preserving historical structures and affordable housing. Infringement of new projects into the buffer zone should be prohibited. This prohibition should be put in place immediately so as to apply to current projects under consideration. The City needs to establish firm policies and redesignate existing structures to be legally non-conforming so that they cannot be replaced. We now have a wonderful opportunity to provide both long-term protection from dangerous flooding as well as restoration and long term protection of Mission Creek's riparian corridor and water quality. In fact, we may never again have such an opportunity.

Cmt#14-3 We encourage the use of more sloping banks in order to reduce the height and use of vertical walls. We also urge that the proposal include more trees, especially large canopy trees to shade the creek in order to protect the riparian habitat and improve water quality. Great care must be taken in improving the estuary. It must be designed to avoid impacts on the coastal wetland and endangered species, while at the same time maintaining water quality and improving aesthetics.

Cmt#14-4 Further, the EIR/EIS should include a full analysis of the impacts of future creek maintenance. The public needs to know how the proposed and necessary maintenance will be accomplished. This flood control project should, from its inception, anticipate and account for the long-term impacts of silt removal and other necessary maintenance measures.

Cmt#14-5 Again, we appreciate the long hours and dedication that so many have put into this project. Staff's commitment to public input and a quality project deserves community recognition. Thank you for this opportunity to provide our comments to you.

Sincerely:

Louise Boucher, President
Citizens Planning Association

Responses to the comments from:

Citizen Planning Assn
Louise Boucher

14-1 Comment acknowledged. The proposed project as designed has been formulated with cooperation of the County and the City and represents a balance to provide the residents of this area a higher level of flood protection and improve the riparian community along the creek.

14-2 See response to comment 12-3.

14-3 To balance the need for flood control improvements and environmental considerations while trying to minimize impacts to adjacent properties, the sloped riprap must begin halfway up the bank. Otherwise, many more complete property acquisitions will be needed to accommodate wider sloping banks. This added cost would likely increase the project cost significantly and render the project uneconomical in accordance with Federal requirements. This could result in non-participation by the Corps to implement this flood control project. Additionally, see responses to comments 1-4 and 12-5.

14-4 See responses to comments 12-8 and 12-10.

14-5 Comment acknowledged.

SANTA BARBARA URBAN CREEK COUNCIL

P.O. Box 1653, Carpinteria, CA 93014 (805) 968-3609

February 9, 2000

City of Santa Barbara
Planning Division
Attn: Jan Hubbell
Project Planner

RECEIVED
FEB 11 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

Re: Draft EIS/EIR, Lower Mission Creek Flood Control Project

Dear City Planners:

Cmt#15-1 The Santa Barbara Urban Creeks Council is a non-profit group with 3000 members, whose mission is to preserve, protect, restore and enhance creeks and aquatic systems throughout the south coast. Long range economic health, community and social values, water quality, environmental values, and quality of life greatly depend on the health of our coastal streams. We have concerns about the Lower Mission Creek project, as it will have lasting and profound impacts on Santa Barbara's future and on the health of coastal aquatic resources.

Cmt#15-2 Throughout the long history of the Army Corps of Engineers' planning for this important flood control project, there has never been a studied focus on water quality. Water quality is an important health and safety component of any planning within the Mission Creek area of influence. The EIS/EIR needs a more in depth analysis of the potentials for enhancement of water quality that may be derived through alternative designs.

Cmt#15-3 Restoration of habitat and riparian aesthetics are also among the concerns of the Urban Creeks Council in making these comments and contributions to the discussions of the Army Corps proposal. Some efforts are being directed towards addressing habitat and aesthetics in the current Army Corps proposal. We are pleased to see this movement towards a solution that will ultimately provide for environmental health as well as flooding protection. It is noted that there have been flaws in past project proposals. Some proposals have been rejected by the public as being inappropriate, for environmental reasons. Another proposal was rescinded over the realization that the project would have sediment transport problems that would defeat its floodwater conveyance capacity. Given the existing urban encroachments within the riparian corridor, and understanding the complexities that these encroachments create with respect to natural stream balance and safe release of floodwaters, it is not surprising that the process has protracted itself over the past 35 years or more. It is realized that this is a difficult piece of planning that requires a

Responses to the comments from:

Urban Creek Council
Eddie Harris

15-1 Comment acknowledged.

15-2. See response to comment 12-18.

15-3 In our effort to balance the need for flood control improvements and environmental considerations while trying to minimize the impacts to adjacent properties, the sloped riprap must begin halfway up the bank. Otherwise, numerous additional complete property acquisitions will be needed. This additional cost would likely increase the project cost significantly as to render the project uneconomical in accordance with Federal requirements and could result in non-participation by the Corps to implement this flood control project. Additionally, see responses to comments 1-4 and 12-5.

15-4 The decision to proceed with a project, which provides approximately a 20-year level of flood protection, is based on several reasons. During the work of the Mission Creek Consensus

	visionary design solution, and a change in the land use ethic We are very encouraged to see that design proposals now include a natural streambed, and are evolving towards a solution that allows for inclusion of other design elements that are essential to aquatic health. However, we feel that the current proposal does not adequately address the important elements of stream hydrology and sediment balance. Shading and water temperatures, and vegetation transitions within the creek boundaries are also essential elements that need to be defined in a more natural context. These elements need to be more clearly specified in the EIS/EIR	Group (of which the Urban Creek Council is a member), it was determined that 100-year flood protection is infeasible, due to the cost and the number of properties directly affected by project construction. The only project that provided 100-year flood protection and was potentially feasible from a cost standpoint would have been a wide concrete-lined channel with vertical walls. This would have resulted in permanent habitat loss and impacts on endangered species, as well as significant aesthetic impacts. For these and cost reasons, this alternative was abandoned.
Cmt#15-4	We also note that the preferred alternative in the current proposal provides for only a 20 year flood protection design. In the past six years, there have been three storm events that have exceeded this level of design protection. Climatic changes, along with increases in impervious land cover within the watershed, have resulted in statistical analyses of flooding risk that must be viewed as approximations, and a generous allowance for error must be assumed.	
Cmt#15-5	In light of the above points, we ask that the Lower Mission Creek project be considered only in the context of a long range plan to restore all reaches of Mission Creek to near natural conditions Such a long range plan would establish adequate buffer zones. It would acquire properties over time, and gain easements and rights of way. It would compel property owners to remove encroachments and impervious surfaces from the creek and from the buffer zones, by providing incentives for gradual retreat. Rather than continuing to use the creek as a back alley and disposal conduit for trash, we promote the idea that the riparian areas can be a visual asset, and views should be focused on the creek. The use of density transfers, and other incentives to encourage retreat and enhancement are currently being discussed by the policies working group that is working with city staff to develop meaningful watershed protections and policies. Such long range planning would ultimately result in addressing 50 to 75 year flood risks, and would restore the riparian buffers to function at near full capacity, as the natural biofilter that is essential to good water quality. Habitat and aesthetics would be greatly enhanced along with this change in the land use ethic. Yes, it would take many years to accomplish this work. The Army Corps project should be considered as just a start for all of the work that is necessary to adequately address flooding and quality of life concerns	Several study objectives as well as constraints were developed and identified early in the feasibility phase to help guide the formulation of alternative plans. Most notably, at the request of the City, three bridges (Cabrillo, State, and Bath) were identified as project constraints with minimal modifications allowed. The conveyance capacity of State Street Bridge established (with minimal improvements) at 3400 cfs, essentially sets the maximum conveyance design considered in this feasibility study. It is important to note that 3400 cfs was established assuming the creek bottom remains natural (as opposed to concrete lined). Maintaining the natural creek bottom is an effort to avoid potential impacts to endangered species in the
Cmt#15-6	With this restoration ethic, and the need for long range commitment in mind, the Urban Creeks Council urges that more work be done to make the Army Corps Proposal conform to a configuration that will ultimately be compatible with hydrology and correct stream dynamics that may one day be returned to Mission Creek. We ask that each reach of the project be designed to provide for the "bankfull" or "active" channel that would efficiently carry sediment in a manner that neither excessively erodes or deposits sediment. In keeping with principles of sediment balance, this would greatly reduce maintenance costs and the associated disturbance of in stream vegetation. In the long range view, flood waters above the capacity of this active channel would one day be carried in terraced riparian buffer zones as adjacent land is acquired, resulting in a significant increase in flooding protection	

	To help with understanding these elements of the design, the EIR/EIS should contain overlay comparison of these four contours, for each reach within the project boundary: 1. Existing stream contour. 2. The natural bankfull channel, derived from hydrogeomorphic data, field based reference sites, and historical data, if available. 3. The Army Corps design channel. 4. Future opportunities for flood plain restoration in terraced buffer zones	bottom is an effort to avoid potential impacts to endangered species in the area, as well as to meet local Sponsor's design criteria. See responses to comments 38-1 through 38-4.
Cmt#15-7	We also want to stress that preservation of historic or other buildings should not take priority over health and safety considerations, in the design of this important project. Planning that addresses both flooding and water quality concerns should provide for moving the important historic buildings out of the creek buffer, to locations where they would be safe from damage. This would allow the creek banks to be laid back to accommodate proper restoration of the terraced flood plain and buffers.	15-5 See comment 12-3. Additionally, the Corps has other authorities which could be utilized for a comprehensive watershed management study. This type of long term comprehensive watershed master planning can be performed for the local watershed at the request of the local sponsors who are willing to cost-share such study.
Cmt#15-8	In addition, the Urban Creeks Council suggests that conditions at Cabrillo Blvd and below be made a part of the project study and EIS/EIR. Obstructions in this lower reach may be contributing to upstream flood water surface elevations	
Cmt#15-9	More specific detail in the EIS/EIR is needed on the project interface with the Entrada de Santa Barbara. This concurrent planning cannot be ignored. An adequate buffer and bioswale outside of the Lower Mission Creek Project boundary is called for here.	15-6 The computer program SAM was used to developed a sediment budget type of analysis. The creek geometry was not optimized for greatest sediment carrying capacity due to the width constraints of the available right-of-way. Instead, the geometry dictated by the available right-of-way, i.e., the recommended plan was analyzed.
Cmt#15-10	We also want to discourage the use of concrete and vertical walls throughout the project. Vertical walls and concrete have contributed to the existing poor biological function within Mission Creek. The EIS/EIR should more specifically address this reduction.	
Cmt#15-11	These comments are submitted with the hope that they will help to chart a course of action that is rooted in correct science and sound principles of watershed stewardship. There is a restoration ethic evolving out of the city and county funded project clean water studies and the subsequent focus on watershed master planning. We would like to see this emerging ethic translated into planning that brings about fundamental change in land use practices. The image that the city of Santa Barbara enjoys as a world leader in implementing environmental protections does not hold up well when the essential components of our watersheds are put to scrutiny, as evidenced by conditions in the lower reaches of Mission Creek. Planning lapses and piecemeal development for short term gain have incrementally created those conditions over many years. A comprehensive solution must also take place incrementally over many years, but must focus on long term benefit for the community. We view the Lower Mission Creek Flood Control Project as an essential part of recovery within the watershed, and ask that planners also adopt this view	

Cmt#15-12

The Draft Feasibility Report and the Draft EIS/EIR both contain descriptions of the location and setting of the project. These descriptions, in their brevity, have omitted an important aspect of Santa Barbara's geographic setting. Being situated on a narrow coastal shelf with the crest of the Santa Ynez Mountains defining the upper reaches of Mission Creek, the setting is rare among coastal cities in California. Mission Creek, like all streams on the south coast, is not impacted by pollution from urban conditions in upstream municipalities. Most coastal cities on the Southern California bight receive polluted runoff from highly degraded watersheds through channelized drainage systems. The runoff in Mission Creek, in contrast, is delivered to us unsullied, from pristine origin. Land use practices within our own urban boundary, (along with pollutant loads from our surface runoff), determine the water quality changes that occur as runoff approaches the Pacific shore. Our setting gives us inherent and arbitrary control over conditions in Mission Creek. Along with this inherent and arbitrary control comes responsibility for overseeing the conditions that exist there. Positive change will result from the exercise of that responsibility through decisions that respect the health of the aquatic systems.

Cmt#15-13

It is hoped that these comments are helpful in providing a perspective for framing the Lower Mission Creek Flood Control Project. The Urban Creeks Council urges that planners consider all of the community values and the long range economic benefit that will be derived through embracing the restoration ethic in this project. Healthy habitat, clean water, greater flood protection, and the aesthetics of planned open space all influence the spiritual and social connections that link people with their city and their environment. These amenities are all dependent on local government addressing the needs of citizens. We think it is possible to address all of these needs. We know it won't be easy, but we believe that positive change can take place over time. And we want you to know that we will be there to help you in all of these efforts, in working towards authentic and correct solutions to the problems in Mission Creek. Thank you for considering this input.

Sincerely,

Eddie Harris
For the Board of Directors
Santa Barbara Urban Creeks Council

cc. South Coast Watershed Alliance
2nd District Natural Resources Advisory Committee
Environmental Defense Center
Waterways Restoration Institute

15-7 In order to maintain Federal participation based on the project cost-benefit analysis, additional buildings were saved to reduce property acquisition costs. Because of the City of Santa Barbara's strong policies supporting historic preservation and retention of housing, historic resources and housing were those buildings that the City recommended to be saved. It should be noted that relocating a structure off the site where it was originally placed usually results in its historic significance being substantially reduced.

15-8 See responses to comments 1-4 and 12-1.

15-9 No bioswale is proposed in this area of Mission Creek. There are existing buildings between the La Entrada project and the creek. See also response to comment 17-30.

15-10 See responses comment 14-3.

15-11 Comment acknowledged. See response to comment 15-5 above.

15-12 See responses to comments 12-16 and 12-17. Additionally, the City has a Clean Water and Creek Restoration Program to improve the water quality of the City's creeks and beaches. This effort will include many of the Best Management

			Practices such as public education/outreach, public participation, elicit discharge detection/inspection, construction site runoff inspection/control, and many other water quality improvement measures.
		15-13	Comment acknowledged.

Small Wilderness Area Preserves, Inc.

Santa Barbara Chapter • P.O. Box 91160 • Santa Barbara, CA 93190-1160
805-687-0687

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FEB 11 2000

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Attn: Jan Hubble, City of Santa Barbara,
Community Development Department

February 10, 2000

Re: Lower Mission Creek Flood Control Project Feasibility Study
Draft Report/Draft EIR

Dear Ms. Hubble:

We are pleased to see the City's efforts to conserve and enhance our local creeks. We strongly support the City's General Plan policy that the creeks are to be regarded as a "scenic open space resource," and we welcome the opportunity to comment on the above project. We would like to raise the following points:

Comm 16-1 **1. Full and equal consideration is still needed for alternatives**

We are concerned to see that the impacts of several alternatives have not been studied on the grounds of relative costs. However, a full review of the potential costs of damaging impacts of Alternative 12 that do not appear to have been considered (some are raised below) must throw doubt on these grounds. In addition, the full benefit of alternative measures does not appear to have been taken into account. Such measures include the possible avoidance of bridge building and the use of sloped, vegetated banks instead of vertical walls.

Comm 16-2 A full study of alternatives seems merited also in light of the dual aim of habitat restoration and flood control. Given the proposed creek widening, likely impacts on the estuary, the removal of vegetation (including many mature trees), and the addition of concrete vertical walls, it is difficult to believe conclusion that the amount of restoration planned will offset the amount and quality of habitat lost. Flood control seems to be the major benefit of Alternative 12, but project assessment needs to be based on a much more thorough investigation of habitat restoration impacts given restoration as one of the principal project goals.

Comm 16-3 We are also surprised that the study has not factored City Redevelopment Agency (RDA) funds already approved for this project. Although the aim of these funds may be to reduce blight, this would be the automatic result of many of the project measures so there can be no reason why the approved $2.5 million cannot offset the cost of relevant project components. These funds would lower the cost of any alternative, but their most appropriate application would be toward those that involve greater environmental protection and less channelization than that offered by the favored proposal. RDA funds would also remove the (mistaken) disqualification on grounds of cost.

INCORPORATORS (1971)
Ansel Adams (1902-1984) ▲ Margaret Owings ▲ Emily Polk ▲ Dr. Edgar Wayburn

Responses to the comments from:

Small Wilderness Area Preserves, Inc.
Maria Gordon

16-1 The primary objective of this project is to provide an increase in flood protection for the residents of the lower Mission Creek. Secondarily, restoration and enhancement opportunities are explored within the features used to improve the creek, whenever feasible. A total of twelve alternatives with varying designs and features were developed. Two alternatives were focused on minimizing creek widening and replacing only the most constricted bridges. These alternatives were found to be uneconomical based on Federal requirements. In other words, the cost of the project does not equal or exceed the benefits that the project would provide. Therefore, they were eliminated from further consideration. The rest of the alternatives developed differ mainly in the manner in which the banks would support vegetation. Alternatives 4 – 11 would use vertical walls and /or stepped-wall bank protection wherein planting would be supported on the step. Vertical walls were used for alternatives 4 and 8, while varying amounts of stepped walls were designed for the rest. For the latter, vertical walls were then used where right-of-ways are constricted. Alternative 12 would use the vegetated riprap slope with a vertical and in constricted areas, vertical walls would be applied. Other alternatives that were considered, but not pursued are included

Comm 16-4

2. Full analysis of biological impacts is still needed

The proposed alternative includes considerable channelization and concrete lining, including some wall extension in order to protect buildings. Again, the emphasis seems to be on flood control and protection of buildings rather than the restoration, or even preservation of habitat.

Widening the creek will erode buffer zones, increase exposure to sunlight, remove vegetation, create new bankside topography, disrupt creek geology, and possibly change crucial creek levels. None of these impacts appears to have been fully studied. In addition, attention is needed to the effects of an increased herbicidal program and the extensive removal of silt that would be necessary due to any widening. Increased herbicide use in particular needs a more through assessment of its effects on water quality.

The negative impact of replacing natural creek walls with vertical concrete has not been fully considered. Again, a proper analysis of alternatives is still needed.

The study does not extend to the viability or otherwise of created wetlands and simply presumes they will be successfully established.

We are very concerned that the impacts to the biological resources associated with the Lower Mission Creek have been seriously underestimated. We believe a more thorough investigation of issues such as the aforementioned should occur before any proposal is adopted.

Comm 16-5

3. Visual impacts need to be studied

The proposals to fence certain areas and to remove mature trees must entail a loss to the aesthetic resource of the Lower Mission Creek. An assessment of the impacts to this resource is surely required given the City's policies in this area.

Comm 16-6

4. Recreational impacts need to be re-assessed

If certain areas are to be fenced and access to others prevented by planting, then a loss must be caused. An examination of this kind of impact seems to be lacking in the study to date.

Comm 16-7

5. Impacts from existing and planned infrastructure needs analysis

The path of Lower Mission Creek takes it through highly developed areas. It seems wise to determine if the Creek is or would be at risk from associated infrastructure such as sewer pipes.

Comm 16-8

Also, we would like to see further examination of the possible impacts of future development such as parking lots that could be sited in or near the estuary zone. Given that changes are planned in the vicinity, it remains unclear how they can be considered compatible with creek restoration.

We feel the Lower Mission Creek Project is an opportunity to showcase the environmental and community benefits that can come from thorough and sensitive planning and we are pleased to be involved in the process. We would be pleased to learn the Planning Department's response and that of the US Army Corps of Engineers to the above concerns.

Yours sincerely,

Maria Gordon

Maria Gordon
Correspondence Secretary

cc: Santa Barbara City Council; Santa Barbara County Board of Supervisors

in Section 3.3 of the EIS/EIR. The cost-benefit criteria used by the Corps are focused on construction and maintenance costs and the benefits of avoided flood damage. The criteria are not set up to evaluate the economic benefits of improved biological habitats and other environmental improvements.

16-2 See above response. Additionally, the Biology section and the Appendices present the habitat evaluation procedure (HEP), which shows that the expected project impacts would be offset by the benefits provided by the project and its features.

16-3 The City RDA funds approved for this project can not be used to cost-share part of the project cost, but will be used to pay for additional betterments to the project that are beyond the Federal cost-sharing authority. State Law and related case law indicate that flood control projects are not included in the list of projects for which RDA funds maybe used. See also response to comment 12-3.

16-4 See responses to comment 1-2, 1-4, 8-12, 12-4, 15-7 and 16-1. Additionally, project impacts are addressed in the Biology Section and Appendix C of the EIS/EIR. Finally, herbicides are not proposed for use in the maintenance plan, except for limited use on the banks to remove invasive plants.

16-5 Impacts to aesthetics and visual resources are discussed in Section 13 of the EIS/EIR.

16-6 Impacts to recreation are discussed in Section 14 of the EIS/EIR. Representatives from the county Flood Control District have indicated that access to the creek will not be prohibited. In addition, the habitat expansion areas will provide for passive recreational opportunities.

16-7 The location of and effects on existing utilities are discussed in Section 19 of the EIS/EIR.

16-8 No new parking lots are proposed south of Cabrillo Boulevard. All new parking lots in the City are required to include catch basins and filters. Development of the area will occur with or without the construction of the flood control project.

February 10, 2000

Jan Hubbell
City of Santa Barbara
Community Development
630 Garden Street
Santa Barbara, CA 93101

RECEIVED
FEB 11 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

RE: LOWER MISSION CREEK FLOOD CONTROL PROJECT FEASIBILITY STUDY
DRAFT MAIN REPORT AND DRAFT EIR/EIS

Dear Jan:

The Environmental Defense Center (EDC) is a non-profit environmental law firm working to protect and to facilitate the restoration and enhancement of native habitats and natural resources in Santa Barbara and surrounding Counties. We have carefully reviewed the draft EIR/EIS, including those of the technical appendices that were attached, and have prepared the following comments for consideration by the City and Corps of Engineers.

Executive Summary

Project Location

Comm 17-1 The proposed project would extend to the upstream side of Cabrillo Boulevard, but would exclude the area downstream from this road. Thus, the project would exclude the existing pedestrian- and/or bike-bridge located south of and parallel to Cabrillo. This downstream-most bridge was referred to by Dr. Ann Riley (please refer to Attachment #1) as a potential constriction of the creek and floodplain. She recommends considering "removing or redesigning these obstructions," to lower "upstream flood water surface elevations... ." This "could represent a significant increase in project benefits to the City." How would removal of this likely constriction effect the project and its ability to convey water all the way to the ocean at the design level of protection (e.g., 3400 cfs and 22500 cfs), or would removal increase flood protection? Would removal reduce upstream water levels at flood stage? Specifically, why was the bike-bridge excluded from the project? How is this exclusion inconsistent with the Consensus Group's recommendation that the project extend to the ocean?

Need for Project / Planning Objectives

Comm 17-2 The DEIR/EIS states that the main purpose of this project is to provide flood protection. In public, however, the project has been presented as having a dual objective that included habitat restoration. Please modify these sections to reflect this dual objective.

The Planning Objectives are stated as: "to analyze the flooding and associated problems along Lower Mission Creek, to consider solution to the ... problems, and to recommend, for implementation, a solution to these problems." However, the objective of any CEQA/NEPA document is to analyze the impacts of a proposed action and to evaluate the relative impacts of feasible alternatives. It is not the objective of a CEQA/NEP document to analyze the

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Letter from:

Brian Trautwein
Environmental Defense Center
906 Garden St.
Santa Barbara, CA 93101

17-1 Widening the Cabrillo Boulevard bridge (and the bike bridge) was analyzed, however, the capacity of the State Street bridge and lower Mission Creek as a whole did not increase.

17-2 On page 14 of the Main Report, the Planning Objectives for the project are outlined as follows:

- Provide increased flood protection for the residents and businesses of Santa Barbara
- Restore the major species of a native riparian community along the project reach
- Remove and suppress invasive non-native vegetation and replace with native plants
- Remove man-made construction materials along the creek bottom and restore to natural creek
- Enhance aquatic habitat by changing the streambed characteristics

These objectives are in addition to the basic objective of contributing to the overall National Economic Development (NED) by increasing the value of the national output of goods and services (expressed in monetary units), while protecting the nation's environment, pursuant to national environmental statutes, applicable Executive Orders and other Federal planning requirements. It should be noted that, in order to qualify as a NED project, a project that includes Federal funding must have a minimum benefit:cost ratio of 1:1. This benefit:cost ratio, while not called out as a separate objective, is an important objective (and constraint) of the project.

of feasible alternatives. It is not the objective of a CEQA/NEP document to analyze the problem that an action is proposed to reduce, in this case flooding, but to analyze the impacts of the proposed action. How could this objective be reworded to capture the intent of a CEQA/NEPA document? Please modify the text to reflect objectives accurately.

The project purpose stated on page 11-9, "is to provide flood control to the City of Santa Barbara and to protect life and property located with the 15 to 20 year floodplain." EDC concurs with the project purpose. This project purpose's wording as written in the DEIR/EIS (on page 11-9) should not now be changed to accommodate the currently preferred plan. It should remain as stated so that more alternatives will then meet those project objectives. Some alternatives may meet the objectives as clearly presented, may reduce significant impacts to less than significant, and be feasible. The goal of CEQA is to identify less impacting feasible alternatives and mitigation measures for approval and implementation. Other alternatives exist which are feasible, meet the objectives and reduce impacts. This affects many of the policy and Coastal Act consistency determinations regarding least damaging feasible alternative, as well as CEQA findings that will have to be made. Therefore, if the City elects to modify the project purpose as written, it will have to recirculate a new DEIR/EIS with the new objective. Currently, however, the objective is to provide a 15 to 20 year level of protection, and this means that a 2500 cfs channel would be consistent with the objectives of the project.

Comm 17-3

ALTERNATIVES

While the DEIR/EIS touts twelve alternatives that are considered, in reality, only one alternative flow capacity, 3400 cfs, is analyzed in the document. No other alternative channel capacities were carried forward for detailed analysis of impacts and policy consistency. Table ES-1. CEQA requires that a reasonable range of alternatives be evaluated in an EIR, but this EIR only compares the impacts of three very closely designed alternatives: #6, #8 and #12, and #1, the token no-project alternative. These three alternatives result in essentially the same level of impacts for all impact areas, vary only in the method of bank stabilization, and are exactly the same capacity as each other (3400 cfs).

Comm 17-4

A smaller alternative, such as the 3210 cfs-sized channel agreed to by the Consensus Group, should have been carefully evaluated in the EIR/EIS, but was not. Such an alternative could include low vertical walls and sloped, vegetated rip rap banks, as is proposed in Alternative #12, but could have lower vertical walls and wider sloped, vegetated banks. Such an alternative would be feasible, would reduce the significant residual visual and biological impacts, and is consistent with the project goal and primary purpose, which is to "provide flood protection to the City," or worded differently, to provide 15 – 20 years of protection (page 11-9).

Comm 17-5

Another alternative should have also been carried forward for detailed analysis in the DEIR/EIS, but was not. The 2500 cfs alternatives (#2 and #3) were dismissed for reportedly having a benefit to cost (b:c) ratio of less than 1. However, the EIR/EIS fails to account for the $2.5 million that the City Redevelopment Agency has approved for enhancements to the Lower Mission Creek Flood Control Project. Use of these funds – not for the flood control

Certainly, flood control is a primary purpose of the project as noted above. However, the statement on Page 11-9 is only a partial and somewhat incorrect statement of the full set of objectives for the project, as noted above. It has been modified to be more consistent with the objectives outlined above.

17-3 Page 3-9 states that Alternatives 2 and 3, which were defined as 2500 cfs capacity alternatives were not considered because they do not meet the required benefit to cost ratio of 1:1 and were, therefore, determined to be economically infeasible.

17-4 The design for the 3210 cfs alternative would essentially be the same as for the 3400 cfs design described in this study. Section 11.5 has been amended to better reflect the project objectives as stated in the Main Report and in the EIS/EIR.

17-5 See Response to Comment 17-3. The title of this subsection should be clarified to be: "Technically Feasible Alternatives Not Evaluated for Environmental Analysis." Project embellishments paid for by the City of Santa Barbara Redevelopment Agency (RDA) cannot, by federal regulation, be considered in the benefit:cost ratio. Even if they were so considered, the costs to the City of using RDA or other funds would also be required to be computed into the benefit:cost formula. Because the benefits provided by the RDA funds are not benefits that are considered in the benefit:cost formula under the federal regulations, only the costs would be added. This would result in increased costs without increased benefits, thus decreasing the benefit:cost ratio, potentially resulting in the cost: benefit being less than 1:1. This would make the project economically infeasible.

project – but for creek enhancements that fight blight - have the incidental benefit of rendering a 2500 cfs channel within the acceptable b:c ratio. However, the use of these funds to incidentally render a 2500 cfs channel feasible was not considered, despite the close relationship between these funds and the project.

Comm 17-6

The $2.5 million approved for the restoration of lower Mission Creek and specifically, as stated by the RDA, to enhance the flood control project, is a known, approved pot of money that will be available at the same time the subject project is constructed. The City, as lead agency, needs to recognize the clear connection between the $2.5 million for restoration and the flood control project, and needs, in the CEQA document, to analyze how this RDA money could effect the flood control project. One of the effects it has is to potentially render a 2500 alternative within the acceptable b:c ratio, and thus feasible. Such a result of coordinated consideration of these two closely related actions changes the documents finding that Alternatives #2 and #3 are not appropriate for detailed consideration and impact assessment. Alternatives #2 and #3 are thus potentially feasible, they meet the project's primary purpose as well as other purposes, and as discussed below, they reduce significant impacts that are associated with the proposed action (Alternative #12). Therefore, in the FEIR/EIS or in a revised DEIR/EIS, please describe and evaluate the impacts of a 2500 cfs channel and how the $2.5 million could be used to fight blight and at the same time to incidentally make a 2500 channel meet the b:c ratio

An alternative similar to #2 or #3 but with an oxbow bypass channel would require replacement of only 5 bridges, rather than the six identified for #2 and #3 in the EIR/EIS. This would make a 2500 cfs channel more likely to meet the b:c ratio, and would save about $3 million in costs compared to a 2500 cfs channel that excluded the oxbow bypass (Alternatives #2 and #3). Please explain how such an alternative might be made to meet the b:c ratio, for instance by including the bypass and/or by utilizing some of the RDA funds in a way that fights blight and reduces project costs (i.e., by buying some of the properties that would have to be removed for a 2500 cfs channel, and restoring those areas.) A modified 2500 cfs channel alternative with a bypass (to reduce costs of bridge replacement) and with low vertical walls and sloped vegetated rip rap banks would avoid some of the significant impacts associated with the proposed project, could meet the b:c ratio, and does meet the clearly stated objectives. In your response, please include a full evaluation of a 2500 cfs channel, as modified by suggestions herein, that meets the b:c ratio by, as an example, including project-related costs that could be covered by the RDA money under the restrictions of redevelopment statutes.

Comm 17-7

The Consensus Group's approved and recommended alternative, which the County Supervisors and City Council approved for consideration in the feasibility study by the Corps, was not studied. Instead of that 3210 cfs channel, the Corps studied a 3400 cfs channel. Therefore, the locally approved and recommended plan (3210 cfs) is not analyzed in the DEIR at all, and only alternatives with a 3400 cfs capacity are studied in detail. The responses should evaluate the feasibility of a 3210 channel with vertical walls and sloped banks, like Alternative 12, and should estimate the reduced impacts and find the new option consistent with the project objectives of providing between 15 and 20 years protection.

17-6 See Response to Comment 17-5. Also, please note that the construction of the oxbow culvert is more expensive than bridge replacement. Because the benefit would still be less than the cost, an alternative using the 2500 cfs capacity, providing an oxbow bypass culvert and leaving Montecito Street bridge in place would not be economically feasible.

17-7 The 3210 cfs version included stepped walls, which you admit at the top of page 14 of your letter would not allow the opportunity for larger native trees to grow. As you state, the stepped wall alternatives (including the alternative endorsed by the Consensus Group in 1994) would only allow shrubby species to grow. The water surface elevation for a 3210 cfs alternative design would in general be approximately 4 inches less than the 3400 cfs alternative.

17-8 The Environmental Defense Center is correct in stating that this section of the Municipal Code has not been included in Section 4, Plans and Policies. See Section 4.1.2 for this discussion.

17-9 The terms "potentially consistent" and "potentially inconsistent" have been used in both City and County of Santa Barbara environmental documents for at least the last 20 years. They are also commonly used by other agencies across California. This terminology is based on the fact that the preparers of the environmental document do not make the final determination of policy consistency. The decision-makers, in this case, the Santa Barbara City Council and the Santa Barbara County Board of Supervisors, sitting as directors of the Flood Control District, will make this determination. Because the project often changes in response to issues raised in the environmental analysis and by the public, the determination included in the environmental document can only be a preliminary determination.

Comm 17-8

POLICY CONSISTENCY ANALYSIS

Santa Barbara City Municipal Code

The Draft EIR/EIS does not include an analysis of the project's consistency with the Santa Barbara City Municipal Code. The Code requires a setback for all new development from Mission Creek of 25 feet or more. Development, including this project, can only be approved in this area if a variance from the City is granted, and only if findings are made that the project would not increase flooding or erosion threats.

Comm 17-9

Potentially Consistent versus Potentially Inconsistent

The term of art "potentially consistent" means the exact same thing as potentially inconsistent, because something can either be consistent with a plan or policy or inconsistent; it has to be one or the other. So, for the EIR/EIS to make a preliminary finding that the project is consistent with plans and policies is equivalent to making the finding that it is potentially inconsistent. Thus, the document does not provide information necessary to determine consistency. A CEQA document must contain sufficient information to make a determination regarding consistency with plans and policies because one category of impacts under CEQA is Land Use Impacts. This category includes conflicts with locally adopted plans and policies (CEQA Guidelines Appendix G, the Environmental Checklist). The DEIR/EIS states that the NOP and Initial Study, which would, include the environmental checklist, is attached to it, but it is not. Therefore, it is impossible to see if the City utilized the correct checklist format, including an impact line item for such conflicts. In reviewing the DEIR/EIS, it is clear that the preparers did not consider policy inconsistencies as Land Use Impacts, as the Guidelines do. The DEIR identifies many potential inconsistencies, and thus must also find a potentially significant Land Use Impact related to policy inconsistency.

Comm 17-10

Charter 1507

The proposed project would be inconsistent with Charter Section 1507 because a solid waste disposal facility is not available for the project construction, which is slated to begin around 2003 and last for four years (worst case scenario), because Tajiguas, the identified disposal site, has only 5 years of capacity in the recently approved bench-fill project. The addition of a substantial amount of material (82,000 cubic yards) to the City's waste stream is a significant impact on City resources because Tajiguas will be completely full by the time construction is in full swing, and there are no approved alternative disposal locations for the City.

Comm 17-11

City General Plan

Page 4-3 refers to the relationship between the City's General plan and Local Coastal Plan (LCP), and states that the LCP "supercedes and refines the General Plan for those areas of the City which lie within the Coastal zone." Please clarify the role of the LCP versus the General Plan in area impacting coastal zone resources, but that are not directly in the coastal zone. If a project impacts coastal zone resources but is located outside of the zone, it still must comply with LCP policies addressing those resources.

Standard language regarding this terminology and process has been added at the beginning of Section 4.

17-10 While the Tajiguas landfill may be closed in five to fifteen years, state and federal laws require the proper disposal of all solid wastes. There will be another location to which materials can be sent. Also, the threshold of significance that the City and the County uses is based on ongoing contributions to the solid waste stream, not one-time construction-related contributions. In addition, the project description will be revised to require that materials not used in the project be recycled to the maximum extent feasible. The contractor will be required to prepare and implement a final recycling plan prior to commencement of construction. It is projected that the project will require 16,000 CY of fill. This amount will be subtracted from the 82,000 CY of material removed from the project area. The remainder of the soil removed from the site will, to the extent feasible, be taken to other construction sites requiring fill. All of the sandstone not used in project construction will either be conserved for use in other City projects or, if badly damaged, recycled. Most of the metal and concrete can also be recycled. The green waste can be composted and recycled as compost and mulch. There are companies that will cut and recycle *arundo* into jute mats. The amount ultimately destined for a landfill will be substantially reduced.

Comm 17-12

Conservation Element

This element includes a policy that recognizes that sometimes policies in the General Plan can conflict, and requires that in such cases, those policies that are most protective of natural environmental resources would apply and control. By proposing to extend the vertical walls (laterally or vertically) in order to protect houses, the project as significantly modified since the release of the DEIR/EIS, results in lower protection for the creek and natural environmental resources. Thus, contrary to the findings of the DEIR/EIS (page 4-9) the project as proposed with the extension of walls to save buildings in the riparian area is inconsistent with the Conservation Element by failing to place a priority on resource protection over protection of non-natural resources, such as buildings. This is a significant policy inconsistency and thus results in a significant Land Use Impact. CEQA Guidelines Appendix G.

Comm 17-13

On page 4-8, the Draft EIR/EIS makes a troubling statement that calls into question the integrity of the document and the decision-making process. It states, "Given that a flood control project must be completed ... ." This statement undermines the entire CEQA process by discounting the No Project Alternative, and it colors the ultimate decision regarding this project. It is essentially a decision in principle about a future consideration, and belongs in an opinion section not a factual informational document.

Comm 17-14

Visual Resource Policies

EDC agrees with the EIR/EIS that the project as proposed and each alternative is inconsistent with the Visual Resource Policies, including Policy 4.0. Despite this finding in the DEIR, it also states that "Alternative 12 would be potentially consistent with these Visual Resource Goals and Policies." This is an internal contradiction. Clearly, Alternative 12 is not consistent with Policy 4.0, which requires integration of mature existing trees into project designs, and which requires that all feasible options be explored prior to removing trees. This policy (and the Conservation Element as stated above and in the DEIR/EIS) places protection of trees over protection of structures. However, the project is being redesigned substantially to protect structures at the expense of trees. As an example, pilings would be used instead of the inverted "T" footings to protect structures, but the EIR/EIS does not state that pilings should be used to avoid tree removal. Had the project and document placed a higher priority on natural resource protection than on protection of structures potentially threatened by the creek widening, then perhaps it may have been consistent with the Conservation Element. It did not, and thus a significant policy conflict, and thus a significant Land Use impact remains.

Comm 17-15

Visual Resource Policy 1.0, while typically meant to apply to new creek side developments, is pertinent to this project. It requires that setbacks from creeks "should be enforced." However, as discussed more under cumulative impacts, this project results in smaller setbacks than the City requires (a meager 25 feet) for many structures up and down the creek. This reduced buffer resulting from the substantial creek widening places structures considerably closer to the creek than they exist now, and this takes away from the City's visual qualities, and is inconsistent with the intent of the aforementioned policy.

17-11 The City's Local Coastal Plan applies only to the Coastal Zone. However, for California Environmental Quality Act (CEQA) and National Environmental Policy Act (NEPA) purposes, the impacts on all resources have been assessed, including the effects of the project, both inside and outside of the Coastal Zone, on coastal resources. In addition, this is a federal project and, therefore, subject to the federal Coastal Zone Management Act (CZMA). The CZMA provides that *each Federal agency conducting or supporting activities directly affecting the coastal zone shall conduct or support those activities which is, to the maximum extent practicable, consistent with approved state management programs*. The California Coastal Act is an approved state management program. This allows the Coastal Commission to look at federal projects that are, in whole or in part, outside the coastal zone if the project has potential impacts on coastal resources. The avenue of review for such projects is the Coastal Consistency Determination, which is issued by the California Coastal Commission and relies primarily on Coastal Act policies rather than Local Coastal Plan policies.

17-12 The City of Santa Barbara Conservation Element has policies in several categories, including: Cultural and Historic Resources; Visual Resources; Air Quality; Biological Resources; Drainage and Flood Control; and Water Resources. Biological Resources Policy 11.0 states: *Where Biological Resources policies conflict, the policy most protective of the natural environment shall prevail.* The Biological Resources policies include policies regarding protection and expansion of agriculture and use of City-owned vacant parcels for community gardens along with other policies protecting the natural environment. The purpose of Policy 11.0 is

Comm 17-16 Elimination of fencing from the project, in addition to reducing significant impacts to recreation and access, or modification and planting of the fencing may render the project more consistent with visual resource policies. However, there are other project components, including the tree removal, which renders it inconsistent with the visual policies of the General Plan.

Comm 17-17 *Biological Resource Protection Policies*
Policy 6.0 of the Conservation Element's Biological Resources (page 4-14) requires that intertidal resources be maintained or enhanced. In comments below regarding the biological impacts, EDC explains why the estuary would be potentially degraded, and how there is not ample evidence to find that it will not be degraded. Thus, the project is inconsistent with the General Plan's Conservation Element. The statement on page 4-14 that all three alternatives would result in some net improvement to biological resources is false and inaccurate. The simplified HEP model (criticized below) that was used had false assumptions and flaws built-in, and it thus it incorrectly determined that this project would improve biological conditions in the creek as a whole. While some resources may be enhanced, overall, there will be a net decrease in biological value in this creek including values to listed species, supporting a finding of inconsistency with the Conservation Element.[1]

Comm 17-18 *Flooding and Drainage*
Alternative 12 and all alternatives considered in detail (#6 and #8) result in the placement of 2.4 miles of hardbank structures in the creek, and removal of only a fraction of that length of existing bank protection structures. On net, there will be a substantial increase in the amount of structures in the creek. Yet the City's policies for drainage, flooding and open space recognize the importance of keeping structures out of creeks and creek banks because they are a "scenic open space resource." Therefore, due to the increased structures in the creek, the project would be inconsistent with Drainage and Flooding (and Open Space) policies of the General Plan.

Comm 17-19 Implementation Strategy 2.2 in this section of the Conservation Element states, "Encourage light intensity use in the floodway or floodway fringe... ." Since the project would fence off the creek to people, the project would not encourage these uses, and it is therefore inconsistent with this Implementation Strategy.

Comm 17-20 Recreation Element
The discussion on page 4-18 of the Recreation Element focuses only on impacts to the Moreton Bay Fig Tree. However, the City's General Plan also requires protection of existing recreational uses. The proposed project would restrict or preclude access to the creek by erecting fencing or bramble patches that would "keep people out" of the creek. This is an adverse impact to recreation and is inconsistent with the City's General Plan policies that encourage preserving recreational opportunities. If access to the creek were encouraged by this project rather than blocked, then the project would comply with recreational policies.

[1] The author of this letter of comment is a Santa Barbara County-approved biologist specializing in riparian ecosystems and habitat monitoring and assessment. Please refer to the attached list of county-approved biologists, and consider this letter to be expert testimony regarding biological issues.

to make it clear that protection of the natural environment and threatened and endangered species is more important than agriculture and community gardens when they conflict. This policy does not apply to other policies in the Conservation Element nor does it apply to the other elements of the General Plan. See Response to Comment 17-203 for discussion of Local Coastal Plan Policies 1.2 and 1.3.

17-13 Given the Conservation Element policy discussed in Response to Comment 17-12, this discussion has been rewritten and the statement of concern to the commentor has been removed.

17-14 See response to comment 17-12 for applicability of Biological Resources Policy 11.0. The discussion regarding loss of skyline trees has been revised. However, please note that Conservation Element Policy 4.0 states that trees should be preserved and protected. Implementation Strategy 4. 2 states that *all feasible options should be exhausted prior to the removal of trees* (emphasis added). Policy consistency is based on the policies, not the implementation strategies. However, the project has been revised to preserve some of the trees. Some of the RDA funding will be used to increase the number of trees planted and, if appropriate, increase the size of some of the planted trees.

17-15 City of Santa Barbara staff reviewed the project plans and the existing conditions. Based on an assumed top of bank for the existing creek, it was determined that there are presently 51 buildings within 25 feet of the existing top of bank. After the flood control project is completed, including proposed demolition of 11 structures, 50 buildings would be within 25 feet of the creek. In any case, since the present purpose of the creek

Comm 17-21

Open Space Element
This section of the General Plan states that "these drainage channels should remain in their natural state, providing recreational facilities ... all such flood control work should be done in a manner that will maintain the natural qualities of the creek open space. Further artificial channelization and/or lining, in any form, must not occur." (emphasis added) This project, while less unnatural than previous proposals by the Corps, still fails to maintain or enhance the creek's naturalness. Increased use of structures, increased maintenance (as described below) artificial widening, and lining of the banks will diminish the natural qualities that creek, although degraded, still exhibits. The project does not provide recreational facilities, and in facts restricts people from accessing the creek for recreation. Moreover, the project still involves the artificial lining and channelization of the creek, and it reduces the creek's open space buffer size. Though not as extensive as earlier proposals, the project still conflicts with the Open Space Element in addition to the elements described above.

Comm 17-22

The Open Space Element is also violated by any of the alternatives' removal of major skyline trees, as stated at the top of page 4-20. However, the DEIR/EIS contradicts itself by then stating that Alternative 12 would be consistent with the goals of the element but that the other two alternatives would not be. Each would include removal of the trees and would include structures in the creek. Thus, Alternative #12 is not consistent with the Open Space Element. This inconsistency also supports a finding of a significant Land Use impact under CEQA (Guidelines Appendix G).

Comm 17-23

Circulation Element – Goal 9
EDC concurs that the project and all alternatives that restrict access to the creek, a pedestrian access way, by including fencing or barrier plantings are inconsistent with the Circulation Element (page 4-26).

Comm 17-24

Local Coastal Plan
This plan and its policies apply not only to projects within the coastal zone, they apply to any project that affects coastal zone resources. This entire project effects coastal zone resources through changing flooding frequencies, access and recreation, and biological and water quality resources which are not controlled by the coastal zone boundary. Please mention this in this section of the document.

The LCP incorporates the Coastal Act language, so in addition to compliance with the LCP, the project must comply with the Act, including Section 30240(a) and (b). See below.

Comm 17-25

Water and Marine Environments
Policy 6.6 requires projects to be designed to not impact shoreline sand supply. This project will result in the need to desilt 2,400 cubic yards of sediment each year. The sediment would be placed outside the coastal zone. Currently, the County does not desilt Lower Mission Creek often, and does not remove that quantity of material from the creek annually (Flood Control District Annual Maintenance plans 1992-93 through 1999-00). Therefore, the

setback is for flood control, a project that improves flood control would result in buildings that become legally nonconforming as to their setbacks. This does not necessarily result in a policy inconsistency.

17-16 The fencing is required for safety purposes. However, fences are proposed to be no more than 42 inches high. Fences would be constructed with pipe and cable or a similar approach that would fade into the scenery and be covered with plantings.

17-17 No environmental degradation from existing condition is expected within the estuary. To the contrary, features incorporated into the design to address public comments (after the public review period) would create significant habitat for small fishes within the estuary. The environmental values of these additional mitigation features will appear in the revised HEP analysis. The Corps believes that the project is consistent with Policy 6.0 of the Conservation Element.

17-18 Most of the existing project reach consists of hard banks of varying types. Much of the existing hard banks are also full height; that is, to the top of the bank. In many locations, there is little to no vegetation. Much of the area that is vegetated consists of invasive non-native species that result in no habitat or biological value. Species such as *arundo* and Pampas grass are so dense that they do not contribute to open space values. There will be fewer full height vertical walls than presently exist. Habitat expansion areas may have no walls at all, except at the side away from the creek to protect adjacent structures. Soil and vegetation would hide such walls. In addition, 15,000 square feet of existing hard bottom creek bed would be replaced with natural bottom. While this project does not meet the

proposal to widen the creek, reducing velocities, will cause an increase in sediment deposition in the channel as evidenced by the DEIR/EIS' statements that desilting would need to occur every year and would remove about 2,400 cubic yards annually. This is a substantial increase in the frequency and intensity of desilting, and it would reduce the amount of sand that makes it to the beach.

17-26 Policy 6.11 only allows this very type of project when "no other method for protecting existing structures in the flood plain is feasible and where such protection is necessary for public safety or to protect existing development." In this case, there are less environmentally damaging alternatives that were considered, that are feasible, but that were not carried further for detailed analysis in the document (Section 3.4 DEIR/EIS: Feasible Alternatives not Evaluated for Environmental Analysis.) In addition, coordinated planning of the use of the authorized $2.5 million in RDA funds with the flood control project would create a wider range of alternatives that are feasible, including feasible alternatives that are less environmentally damaging than the proposed project. Therefore, it cannot be found that the proposed project is the least environmentally damaging alternative when additional money is available for RDA purposes which could have incidental benefits of making more alternatives feasible by paying for, for instance, the additional vegetation and relocation of structures which would incidentally would render project costs lower and would thus render more alternatives feasible (including less damaging alternatives). Alternative 12 is <u>not consistent</u> with LCP Policy 6.11.

It should be noted that the DEIR/EIS states (page 4-31) that "Alternative 12 would come closest to meeting this test." In other words, the proposed project would be the closest to complying with LCP Policy 6.11, but it would not comply. This <u>inconsistency</u> is another reason to find significant Land Use impacts (CEQA Guidelines Appendix G). It should also be noted that other options not considered in the DEIR/EIS' limited alternatives assessment, or considered but dismissed, would comply with the LCP and are feasible. Please see discussion under Alternatives. Page 4-312 states that, "with inclusion of these measures, Alternative 12 would be <u>potentially consistent</u> with these policies." However, the cited measures are not proposed as part of the project and do not override the fact that other options are feasible and would be less environmentally damaging than Alternative 12.

17-27 Policies 6.1 and 6.8 require protection and where feasible enhancement of biological resources and water quality in creeks. The discussion states that each of the alternatives would "result in some net improvement to biological resources," and would be "neutral or improve habitat for threatened and endangered species." However, these statement are riddled with inaccurate assumptions. First, for Alternative 12 to result in more than negligible biological improvement, the created wetland and the habitat expansion zones must be built. But both of these features, according to the EIR/EIS are up in the air and dependent on various factors beyond the complete control of the City and Corps at this point in time. CEQA requires a worst case scenario analysis of impacts. This requires that an assumption be made that the wetlands cannot be constructed and that some or all of the habitat expansion zones are unavailable. Second, several project impacts to steelhead were not analyzed in this report, rendering it legally inadequate, and the impact assessment did not address the potential

full goal of having no structures in the creek, it moves toward that goal as much as can be accomplished given the limits of funding.

17-19 See Response to Comment 17-16 above. County Flood Control District staff has indicated that access to the creek bed would remain substantially the same as it is now. Also, the habitat expansion areas would provide additional access to the creek banks, including interpretive signing and some passive recreation, such as pathways and benches, consistent with the primary purpose of expanding the habitat area. Finally, consistency is based on the policies, not the implementation strategies.

17-20 See Response to Comment 17-16 above. Also, the use of California wild rose and blackberry is intended to prevent people from sleeping on the banks. In addition, a discussion of neighborhood parks and riding and hiking trails has been added to Section 4.2.4.

17-21 See Response to Comment 17-18 above.

17-22 Native skyline trees would be removed at two locations, one an individual tree and the other (left hand bank just above Bath Street bridge) a tree with multiple trunks, or a cluster of genetically distinct individuals growing very close together. Prominent sycamores at four locations would be protected. Four eucalyptus and one pine which might be considered by some as skyline trees would be removed. The Corps intends to plant a minimum of 250 native trees, which will eventually grow to a major skyline stature. Assuming 90% percent survivorship in thirty years time, 225 large trees would replace those removed from the project.

for impacts to the goby and steelhead from reduced estuary depth. Based on this reasonable worst case scenario and additional impact issues, each alternative including the proposed project results in net adverse impacts to biological resources. (See additional discussion under biological impacts.) Considering this, a finding of consistency with the LCP Policies cannot be made.

Comm 17-28

The discussion regarding this issue in the EIR/EIS (page 4-30) assumes the new .6 acre wetland would be constructed. However, there are problems with this that go beyond the soil contamination, which may preclude restoration of this site to wetland. The DEIR/EIS relies on a flawed, simplified HEP Model that did not account for very important factors as discussed below. The finding of potential consistency with this section of the LCP assumes a best case scenario instead of a worst case as required by CEQA. It relies on the earlier finding that there are no other less damaging alternatives – a finding EDC disputes (please refer to Alternatives Section).

Comm 17-29

Visual Quality
Page 4-32 asserts that Alternative 12 has "the greatest opportunity for habitat restoration." This statement is limited by the DEIR/EIS' restricted alternatives analysis. Only alternatives with a 3400 cfs capacity were considered in detail. Would an alternative that took advantage of the potential improvements (additional restoration and relocation of riparian structures) associated with the $2.5 million in RDA funds not have a greater opportunity for restoration? Since the $2.5 million is known to be dedicated for the enhancement of the flood control project (as presented to the RDA on 12-7-99) then the environmental review and alternatives analysis in this document must account for that information. That information renders further alternatives feasible (meeting the b:c ratio) because can incidentally cover costs of the project alternatives initially declared to be infeasible, raising the b:c ratio to above 1. Such alternatives can reduce significant visual and other impacts (loss of specimen trees) while meeting the basic project purpose and remaining feasible. Alternative(s) that accomplish this must be evaluated and selected as preferred option(s). Thus, since other less visually intruding projects can be found to be feasible, Alternative 12 is inconsistent with the Visual Resource Policies of the LCP.

Comm 17-30

Land Use
Alternative 12, by using essentially only vertical walls in the waterfront area (much like Alternative 8, and not including more than negligible revegetation in this area, would fail to maintain the naturalness of Mission Creek at this location. By replacing the existing natural bank on the northwest side of the creek with a vertical wall, the project would violate LCP Policy 12.2. In addition, the combination of this creek-widening project and the La Entrada and Harbor View projects recently approved by the City will eliminate the buffer along portions of the project reach between the approved parking lots and creek bank. The creek at this location is an estuary, habitat for at least two endangered species and is an important "natural" open space/habitat on the crowded waterfront. By placing two parking areas at the top of the east bank of the Mission Creek Estuary -- this combination of several geographically and temporally related decisions by the City have resulted in a serious land use incompatibility. The Mission Creek Estuary – an important ESHA (Public Resources Code

17-23 Comment acknowledged. See Response to Comment 17-16 above.

17-24 Comment acknowledged. See Response to Comment 17-11.

17-25 To assist in determining future maintenance needs, additonal detailed sediment routing will be completed during the Pre-construction Engineering and Design (PED) phase of the study. According to the draft maintenance plan prepared by the County Flood Control District, with the assistance of Dr. Ann Riley, if the silt removed is of beach quality, it will be deposited on the beach, subject to necessary permits.

17-26 Policy 6.11 of the City Local Coastal Plan (LCP) echoes California Coastal Act Policy 30236. Both policies allow for channelization or alteration of streams for *flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect existing development*. The policy requires that the project incorporate the best mitigation measures feasible. Feasible is defined by the Coastal Act as meaning, *capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors*.

Flood control is needed to protect both public safety and existing development in the area. There have been at least 20 significant floods since 1900 and substantial damage to existing development has resulted. However, as noted above, both the Coastal Act and the City LCP limit the development of flood control facilities to those where there is no other feasible method for protecting existing structures. The Environmental Defense

Section 30107.5) will not be buffered but will be adjacent to significant new parking areas. Due to this incompatibility, the project will violate the LCP's land use policies.

Coastal Act Consistency

This section of the comment letter will address information in Section 4.4, Appendix D, and other sections of the DEIR/EIS that relate to consistency with the Coastal Act. The City's LCP incorporates the language if the Coastal Act in the certified LCP, and refers to the Act's provisions as the guiding principles of the LCP. Therefore, any inconsistency with the Coastal Act is also an inconsistency with the LCP, and must be evaluated as a Land Use Impact under the CEQA impact analysis.

Comm 17-31

Recreation, PRC Section 30221

Throughout the DEIR/EIS including page 4-12, the fencing or other mechanisms "to keep people out" of the creek is discussed. However, the document does not address the proposal to limit access to the creek for passive recreation in an area lacking such recreational opportunities. The creek is currently used for recreational purposes because people can access it. This will be precluded as proposed by the project. Therefore, this project reduces opportunity for recreation in this part of the Coastal Zone, and it specifically eliminates the only opportunity for passive recreation associated with creek access in the City. It therefore raises potential conflicts with the Coastal Act, and thus the LCP.

Comm 17-32

Marine Environment – Section 30230

The DEIR/EIS repeats that all of the alternatives would result in some net improvement to biological resources. As one of few Santa Barbara County-qualified biologist specializing in riparian habitat and wetland monitoring and restoration, on behalf of the EDC, I am qualified to counter the flawed approach used in the HEP. The document relies on incorrect "best case scenario" assumptions, and the other unproven, unsure or improperly designed features to justify consistency with policies, the Coastal Act and a finding of no significant biological impact. Therefore, EDC disputes these findings. There are inconsistencies and weaknesses in the document as it relates biological habitat and impact assessment that we address throughout this letter.

The project will not result in a net biological or water quality improvement due to numerous factors including reduced buffer, increased maintenance, unavailable land for restoration of habitats, and other impacts unforeseen in this shallow impact and policy consistency analysis. Therefore, the project would threaten to violate the Coastal Act (PRC Section 30230 and 30231) and LCP.

Comm 17-33

Wetlands, Estuaries, Coastal Waters and Streams

Section 30233 of the Act prohibits the diking, filling or dredging of coastal wetlands, waters and estuaries except under limited circumstances including only:

1. New or expanded port facilities and commercial fishing facilities
2. Maintaining existing, or restoring previously dredged, depths in existing navigational channels, boat launching ramps, etc.,

Center has raised the question of why the U.S. Army Corps of Engineers is not proposing to do either a short vertical wall with vegetated riprap slope above or a full vegetated riprap bank below the freeway. There are several reasons why this is not being pursued. Alternative 12 (the Preferred Alternative) is projected to cost approximately $18 million (this includes revisions to reflect the gross appraisal of acquisition costs prepared for the City and changes to the project design to reduce land acquisition costs). An alternative that consists of a short vertical wall and vegetated riprap slope at 1.5:1 (H:V) above would require an additional 20 feet of width (10 feet on each side) to construct. An alternative that consists solely of vegetated riprap slope at 1.5:1 would require an additional 26 feet of width (13 feet on each side). Because of the location of the existing structures in this area, it would be necessary to remove several structures or portions of such structures. Property acquisition and remodel of the remaining buildings alone is estimated to cost an additional $4 million. This assumes that, instead of full take of the buildings involved, it would be possible to remove a portion of the buildings and remodel the remainder rather than completely demolish the structures. If it is infeasible to remodel the structure(s), costs could be even higher. In any case, because the benefit from the Corps standpoint would be substantially unchanged, but the costs would substantially increase, it would not be possible to meet the required benefit:cost standard. Therefore, a project alternative that includes riprap side slope for all or part of the length south of the freeway is infeasible.

Comm 17-33 cont.

3. New or expanded boating facilities' entrance channels in wetlands only, and only with substantial restoration,
4. In open coastal waters including new or expanded boating facilities and structural pilings for public recreational piers that provide access,
5. Incidental public services including burying cables and pipes,
6. Mineral extraction, including sand, except in ESHA,
7. Habitat restoration, and
8. Nature study, aquaculture or similar resource dependent activities

The Act does not provide for the installation of vertical concrete wall for flood control or any other purpose in coastal estuaries. Subsection (d) of this section of the Act refers to "flood control facilities constructed on water courses can impede the movement of sediment and nutrients." It goes on to discuss the option of placing sediment that accumulates in flood control facilities onto the shoreline so that it is distributed into the littoral zone. Thus, the Act envisioned maintenance of flood control facilities that collect sediment (e.g., sediment and debris basins) presumably under 5 above, but does not include language regarding allowing the filling, diking and dredging for flood control channel widening and channelization project. Therefore the project would be inconsistent with Section 30233.

Comm 17-34

If however, it were deemed that a channel widening and vertical wall (channelization) project in a coastal creek may be consistent with the Act despite any language in it to that effect, then the project will still have meet the following test to actually comply with the Act: It has to be the least environmentally damaging feasible alternative, and it has to employ feasible mitigation to minimize the adverse impacts. Alternative 12 does not meet this test because there are less damaging feasible alternatives that were both not analyzed in the DEIR/EIS I detail, or were not considered at all. Since this is EDC's first chance to view the alternatives, we were unable to give earlier guidance (except during scoping EIR period which we did) regarding the need to analyze a wider range of channel capacities. As it stands, there is only one capacity analyzed: the 3400 cfs channel. In addition to being an inadequate range of alternatives from a CEQA perspective, it also undermines the ability to make a finding of consistency with the Coastal Act (PRC Section 30233) because the inadequate alternative analysis did not look at feasible, less damaging alternatives that meet the project objectives.

Comm 17-35

The further important and related consideration is the $2.5 million the City has earmarked for restoration of Lower Mission Creek and that RDA has termed "Enhancement of Lower Mission Creek Flood Control Project." With this additional consideration that unfortunately was not addressed in the DEIR/EIS, more alternatives can meet the b:c ratio because this money, while required to be spent on RDA improvements (fighting blight along the creek), these can have incidental benefits to the flood control project that would offset flood control project costs, thereby increasing the b:c ratio. It must be clear that the RDA money can only be used to fight blight and cannot be used for the flood control project. However, in the course of fighting blight by, for instance, relocating a structure from near the creek bank, the RDA creek restoration funds can play into the flood control project in a way that makes feasible additional alternatives that, absent consideration of the $2.5 million, were considered uneconomical. That is why EDC was disappointed and surprised not to see this closely

17-27 A complete re-evaluation by HEP now incorporates all additional features now planned as mitigation for possible temporary impacts to both endangered fish, and excludes any potential merits of the Caltrans property at the oxbow. Alternative 12 would yield higher habitat values for both the aquatic habitat and the stream bank habitat than that projected for the No Action Alternative.
Future stream channel maintenance (a detailed mitigation monitoring plan has been prepared and included in the EIS/EIR), would impose a mosaic pattern of mowing perennials that get started in the streambed, and creation and preservation of a low-flow pilot channel within the creek. That pilot would be planned in conjunction with mitigation features and the expected natural course of the creek to optimize movement of sediments and create permanent scour pools beneath the ledges. Hydraulic analyses included in the DEIS/DEIR indicated the proposed project would not alter water depth in the estuary in any way. Tidal influence determines water depth in the estuary and the project would not alter that tidal influence. In consequence, neither fish could incur any impact.

17-28 The HEP analysis has been revised to project habitat values without any reference to the property in question. Alternative 12 would yield net increases in habitat units for both aquatic and stream bank habitats. The project would be consistent with the Local Coastal Plan. Please see Section 10, Biological Resources, of the EIS/EIR.

17-29 See responses to comments 17-3 and 17-5.

17-30 First of all, at a minimum, the revegetation that would result from the two habitat enhancement areas immediately above and below the Mason Street Bridge would be larger than the present bank area just upstream of State Street on the northeasterly bank. In

related effort with approved funding discussed in detail or at all in the DEIR/EIS. It is so integrally related to the project that it cannot be viewed separately from a CEQA standpoint, and the DEIR is flawed for not disclosing the RDA funds, discussing how they relate to and can change the project design because of their incidental benefits to the flood control project.

Comm 17-36 This all relates to consistency with PRC Section 30233 because, if the DEIR/EIS did not disclose, discuss or consider how the $2.5 million may make other less damaging alternatives now feasible, then there is no way to find that the Alternative 12 is the least damaging feasible alternative. This project can only comply with Section 30233 if it can be shown that there are no other feasible alternatives that are less damaging.[2] Please disclose and discuss how this funding relates to the proposed project. What can this money be used for? To purchase blighted parcels for creekside restoration? Would this have incidental benefits for the flood control project by, for instance, being able to lay back the banks in more places? How can the incidental benefits of this funding to the project make feasible the alternatives discussed in this letter and Alternates #2 and #3, while still only being used on RDA type projects?

Comm 17-37 The discussion on page 4-41 of the consistency with Section 30233 states that there would be no diking or filling in the estuary. This is a false statement because the installation of vertical concrete walls in placement of fill in the estuary, and is also a form of diking. Furthermore, the project does include dredging, which will also be done. According to the analysis, if one can call it that, the project complies with the Act because there would be no diking, dredging or filling, is completely askew because there will be these activities; they are part of the project. Section 30233 says these activities are not allowed in estuaries. It provides some exemptions, but not for a flood control channelization project. Therefore, the project violates the Act. Furthermore, it violates the Act because there are less damaging feasible alternatives as discussed in this letter, and less damaging alternatives that could be rendered feasible by consideration of the related $2.5 million for creek restoration.

Comm 17-38 Also, since there are significant biological impacts in contradiction with the report's findings, there must be mitigation for these impacts, but the project proposes none. Section 30233 requires, in addition to being the least damaging alternative, for projects allowed under this provision, that their impacts also be mitigated. This project proposes no biological mitigation, and its findings of no significant biological impact is incorrect, as discussed below.

Comm 17-39 Section 30236, which authorizes flood control projects in coastal streams, also requires "best mitigation measures feasible." An important distinction must be made, though. Section 30233 specifies what can be done in coastal estuaries, and through exclusion, it precludes channelization and flood control construction. Section 30236 authorizes flood control projects in streams. Therefore, while channelization may be allowed in coastal streams within the tight restrictions of Section 30236, it is not permitted in the estuary. The proposed

[2] Note: this is a lesser standard than CEQA's provision for requiring denial of a project if there is a feasible alternative that fulfills the main objective(s) of the project but can do so while causing one or more fewer significant impacts.

addition, these habitat expansion areas would consist of native vegetation, while the area just above State Street is vegetated primarily by pampas grass, an invasive non-native plant. The vertical walls between State Street and Cabrillo Boulevard would be either the same height they are now or shorter and the non-native plants would be replaced with native species. In addition, the old pilings between Mason Street and Cabrillo Boulevard would be removed. The buildings would be no closer to the bank than they are now (or are approved to be), thus resulting in no change to the openness that presently exists. In fact, at 15 West Mason Street, where the existing building protrudes into the channel, there would be no building at all. Instead, there would be an expanded habitat area. The parking lot on the easterly side would be landscaped, which is not the case now. The Harbor View Inn expansion was approved in March 1999, based on the 60 foot width. As the Municipal Code allows, the Planning Commission granted a waiver to allow some of the new building on the east side and part of the parking lot on the west side to encroach into the 25 foot setback. However, unlike the existing situation, there would be a native landscape buffer on the westerly side of the creek. In addition, the landscaping in the parking lot on the east side of the creek would also consist of native species, which is not the case at the present time. The La Entrada project was approved by Planning Commission in July 1, 1999, and by the Planning Commission on August 17, 1999. To the extent that plans for the Lower Mission Creek project were known, they were considered in both cases. Each of the individual projects was reviewed against LCP Policy 12.2. Cumulative review of projects under the policies is not required. It will be necessary for decision makers to evaluate the Lower Mission Creek project against this policy at the time final decisions on the City's

project then has it backwards by proposing almost all of the tall vertical walls in the estuary (channelization) and using more sloped and vegetated banks upstream from the coastal zone. For this reason, unless the project is changed to eliminate channelization from the estuary, it would violate 30233.

Comm 17-40

Section 30240(a) and (b) – ESHA
Very similarly, the project would violate Section 30240(a) of the Coastal Act by allowing uses in the ESHA that are dependent on the resources of the ESHA and that threaten to degrade it. The DEIR/EIS refers to the readers for a discussion of the "Biological Resources impacts above." This indicates that the preparers confused the issue of Coastal Act consistency with that of impact and mitigation. While the document finds that there are not significant biological impacts – an assertion EDC strongly contends – this still does not change the fact that a use is proposed in an ESHA that is not dependent on the ESHA's resources. While the DEIR does not discuss this aspect of complying with 30240(a), and while some may argue that Section 30233 must be looked at for more specific guidance on what is allowed in coastal waterways, Section prohibits the diking, filling and dredging of coastal estuaries except for limited purposes that do not include flood control channelization projects.

Comm 17-41

The project, in a cumulative sense and project specific sense, fail to provide adequate buffers for ESHAs. The creek and estuary both meet the Act's broad definition of ESHA (PRC Section 30107.5) because they are rare habitats threatened and easily disturbed by human activities and development, and because they support listed species. By widening the creek and the estuary, including widening (hopefully without reducing water depth) the goby and trout habitat, the project will reduce buffer areas required under Section 30240(b) between developments and the habitat.

Comm 17-42

Furthermore, the City has approved at least two projects in the past year which, when combined with the creek widening, totally eliminate the buffer. The City failed to plan these projects in a coordinated fashion, and as here, does not look at specific cumulative impact issues like buffer size in violation of CEQA. As a result, the City approved projects encroaching toward the creek knowing full well the creek would be widened, and is now proposing the widening which will eliminate the rest of the buffer at these two projects. It will also reduce the buffer to every structure not removed along the entire 1.2 miles. Thus, by significantly widening the ESHA and thus reducing the buffer width to an ESHA, this project poses serious concerns regarding Section 30240(b).

Comm 17-43

Development – PRC 30251
New development in the coastal zone is supposed to minimize the alteration of natural landforms and to protect views. By reducing or eliminating the buffer to existing development, the project violates this premise. Additionally, changing the northeast lagoon bank from a sloping vegetated bank to a vertical wall with no landscaping above it, the project violates the Coastal Act (PRC Section 30251). Furthermore, with the unconsidered $2.5 million, the project could be done in a way that reduces landform alteration (maintains more slopes) and impacts to views.

participation are made. As a result of concerns raised by Coastal Commission members and staff, the project applicant has proposed a redesign that would set the new building 25 feet back from the projected creek width. If the project is not built, the removal of the building at 15 West Mason Street would result in the existing building at 35 State Street being outside the 25 foot setback for the flood control project.

17-31 Coastal Act Policy 30221 specifically refers to ocean front land. The project area is north of Cabrillo Boulevard; therefore, it is not considered ocean front land and this policy does not apply. See response to comment 17-197 for a discussion of recreation impacts.

17-32 The Habitat Evaluation Procedure (HEP) analysis was prepared by a biologist formerly engaged in diverse areas of ecological research, publication, and teaching, and one who by virtue of 25 years ecological expertise is equally well qualified to judge the biological features of Lower Mission Creek.

The HEP analysis approach is used in all Corps documents, as allowed by the Corps guidelines for carrying out NEPA requirements. Section 15226 of the CEQA Guidelines requires that local and state agencies cooperate with federal agencies to the fullest extent possible, including completion of environmental research and the preparation of joint environmental documents. This can include using NEPA standards for impact analysis. We would also note that the California Coastal Commission accepts the use of the HEP analysis for environmental review and policy analysis purposes.
A modified HEP analysis need only be as elaborate as environmental conditions and project design warrant. The HEP analysis prepared for the joint DEIS/EIR could not

Comm 17-44

AFFECTED ENVIRONMENT AND IMPACT ANALYSIS
On page 5.1 the DEIR/EIS repeats a mistake by stating that Alternatives #2, 5-7, 9, 10 and 11 provide some incidental environmental benefit. This is false. These options use the stepped wall that would only allow shrubby species to grow. The ancient native trees could not be replaced. The baseline environmental conditions in terms riparian vegetation is better than what a stepped-wall alternative would provide.

Comm 17-45

It goes on to say that "Alternative 12 provides the maximum opportunity for providing environmental benefit." While this may be true of the alternatives considered in detail in the document, there are other alternatives presented that would provide more. Furthermore, just because it provides the maximum opportunity for providing incidental environmental benefit doe not mean it actually provides it. The inclusion of the "wetland" and the habitat expansion zones in the project without being able to verify their availability is a best case scenario – the opposite of what CEQA requires in impact assessments.

Comm 17-46

Section 5.3 of the DEIR/EIS declares that there are only two significant resources in the project reach: biological resources and cultural resources. However, the City's LCP Policies place a high priority on coastal aesthetics, and this project, by removing most or all of the mature trees, significantly impacts views. This scenic resource is in many ways as important to the City as its biological resources within the creek and its historical resources along the creek.

Comm 17-47

Under Biological Resources (Section 5.3) the DEIR/EIS fails to discuss the role of the estuary in the steelhead lifecycle. This role is essential to steelhead survival. By ignoring this aspect of the lifecycle, the DEIR is flawed in its determination of no impact to steelhead. Steelhead must utilize brackish estuaries to adapt to and from salt water environments. Smolts will stay in estuaries sometimes for months before entering the sea. During this critical time, smolts grow rapidly in the food-rich environment of coastal estuaries in this region. They must grow large enough to reduce their chances of being eaten at sea. Thus, estuaries are vital to the survival of steelhead. Exclusion of this discussion significantly effects the impact assessment.

Comm 17-48

Lower Mission Creek does have rearing conditions in some reaches. Wherever there is freshwater that flows for long enough for steelhead to hatch and grow to several inches (3 months) there is potential rearing habitat. Steelhead can also over-summer in pools in the project reach, as evidenced by two over-summering adults at Islay Street not far upstream from the project reach in 1998.

Comm 17-49

<u>"Two Most Important Resources"</u>
The DEIR limits its discussion of important resources under biology to two species. Other significant biological resources include the estuary, the aquatic habitat, and the mature trees that are genetically very significant. Please discuss the importance of the trees in light of new information (Wayne Ferren, personal communication, 2-8-00) regarding the genetic integrity of *Platanus racemosa* (Western Sycamore)). Most sycamores planted in recent decades are from non-local seed stock, and are hybridizing with the native sycamores such that sprouts

have included the mitigation features, the mosaic maintenance plan, nor the various environmental commitments, all of which have now been incorporated, because of numerous changes in projewct design made since December 1999 in direct response to various regulatory agencies and the Environmental Defense Center itself. Use of the Caltrans property between Gutierrez Street and the freeway has been excluded altogether in the revised HEP analysis. Use of five other remnants of private property as habitat expansion zones is not conjectural. They will be created. With all due respect, the revised HEP analysis is a realistic appraisal of existing habitat quality and a conservative estimation for ecological values which can be realized from the recommended alternative.
Please refer to the Corps' response to the 28th comment.

17-33 Coastal Act Policies 30233 and 30236 must be reviewed together to determine what and what is not allowed in coastal streams. Policy 30233 limitations are focused on open coastal waters, wetlands, estuaries and lakes. Policy 30236 is focused on rivers and streams. In discussions with Coastal Commission staff, Policy 30233 is applied to major estuaries and wetlands on lists of such habitats prepared by the California Department of Fish and Game, such as Goleta and Devereux Sloughs and Carpinteria Salt Marsh, and to the open ocean. Where no major estuary is involved, as is the case with Mission Creek, Policy 30236 is generally applied. For discussion of consistency with Coastal Act Policy 30236 and LCP Policy 6.11, see response to comment 17-26.

17-34 See response to comment 17-26.

17-35 See responses to comments 17-3 and 17-26.

collected locally are thought to be hybrids. This information renders these specimen trees, which sprouted before non-native sycamores were introduced, as unique sources pure *Platanus racemosa* of the Santa Barbara south coast area.

Comm 17-50 Assessment of Fig Tree Impacts
For organizational purposes, the Moreton Bay Fig Tree is not a biological resource. It is a historic, cultural or social resource and should be removed from all biology sections.

Comm 17-51 Section 5.4 Summary of Environmental Consequences of the Preferred Option
Under biological resources, the DEIR/EIS fails to note that gobies burrow, and thus cannot easily be captured under the scenario described. The scenario will result in taking of gobies because they will be left high and dry in burrows. It also says that the project would avoid all impacts to steelhead by not working in flowing water during December 15 through March, however, steelhead do occur in the creek during the summer and fall too, as evidenced by two adults over-summering at Isle in 1998. Furthermore, steelhead can present in the estuary almost year-round.

Comm 17-52 Impact Analysis Improperly Blends Significant Impacts With Positive Impacts to Avoid a Finding of Significant Impact
We note that the EIR does find that "significant temporary impacts to" bank vegetation (page 5-6) will occur. Regardless of other reported beneficial impacts, the biological impacts are significant, and the lead agency cannot find that a beneficial impact cancels or offsets a significant impact. Since a significant impact has been identified, the DEIR/EIS' finding that biological impacts are not significant is flawed. Apparently the DEIR/EIS preparers believe that one can blend significant impacts with beneficial impacts, but this is prohibited by CEQA which requires that if any significant residual impacts result, regardless of the beneficial impacts, that a statement of overriding consideration be made before the project is approved.

Comm 17-53 Area of New Concrete Coverage in Creek
Please specify the total area of concrete bed removal. This is beneficial impact, but is small compared the increased maintenance impacts, as discussed below. In comparison, 2.4 miles of new hard bank stabilization – vertical walls, will be constructed. At one foot thick, this equates to approximately 12,672 square feet of creek bed/bank will be covered by concrete. This is a quarter acre of new concrete. How does this compare to the removal? This is a significant impact not identified in the DEIR/EIS – the placement of ¼ acre of fill concrete in the creek. If the walls are thicker, then the coverage of creek by concrete is more drastic.

Geology

Comm 17-54 Geotechnical Report
This reader was dismayed not to have the geotechnical report attached as Appendix B or elsewhere in the report. The DEIR stated that it would be in the back, and the EDC requests a copy of the report and additional time to comment on the it because it is supposed to be part of the DEIR. We also request that the City hold open the period to submit comments regarding the DEIR/EIS as it relates to the geotechnical report, until after EDC has had an opportunity to review it.

17-36 See responses to comments 17-3 and 17-26.

17-37 See response to comment 17-26.

17-38 Mitigation measures have been proposed in Section 10 of the EIS/EIR. These have been expanded upon, based on the results of the Endangered Species Act Section 7 Consultation with the U.S. Fish and Wildlife Service for the tidewater goby and the National Marine Fisheries Service for the Southern steelhead.

17-39 See response to comment 17-26.

17-40 We concur that Mission Creek qualifies as an environmentally sensitive habitat area (ESHA). A flood control project would be a use that is dependent upon the resources (after all, if there weren't a creek here, there would be no flooding) and, therefore, could be allowed, subject to showing that the habitat values *shall be protected against any significant disruption* (emphasis added). Because this particular policy requires that habitat values will not be significantly disrupted, we believe that it is appropriate to use the similar approach of significant versus adverse, but not significant effect or disruption. As indicated in Response to Comment 17-26, it is not only necessary to look to Coastal Act Policy 30233, but to Policy 30236, as well.

At the recommendation of National Marine Fisheries Service, Fish & Wildlife Service, and California Game and Fish, substantial mitigation measures and environmental commitments have now been incorporated into the proposed project. These additions, since the Draft EIS/EIR, would avoid or minimize impacts to steelhead and tidewater gobies in Mission Creek.

Comm 17-55

NOP, Initial Study, and Environmental Checklist
The Initial Study and NOP is also in the table of contents of the DEIR/EIS as an Appendix I. Its absence form the report has apparently limited the scope of issues to be addressed in an EIR. According to the relatively new CEQA Guidelines Appendix G, the environmental checklist, there are a series of types of impacts within each impact category. Under geological impacts and processes, for instance, one impact is the modification of any unique or important geological features. The DEIR/EIS, however, does not come close to reflecting the number and variety of impact types found in Appendix G's checklist.

Comm 17-56

Impacts to Geological Features: Pools and Banks
This project would, for instance, result in covering of pools during sediment removal or redistribution projects. In fact, the DEIR/EIS indicates that pools would be targeted for filling as "scour" areas in the bed. Pools are a significant geological feature, and uncommon in the City. They are also important biologically. This project will increase sediment deposition and desilting as described under Maintenance Issues. Therefore, there will be increased silt removal compared to baseline conditions.

Comm 17-57

The Flood Control District has removed silt from the lower creek once in the last three Annual Plan Cycles. It proposed to remove about 350 cubic yards directly underneath the Highway 101 bridge and the Montecito Street Bridge. Santa Barbara County Flood Control Annual Maintenance Plans 1997-98, 1998-99, and 1999-00. This is compared to the DEIR/EIS proposal that 2,400 cubic yards per year would have to be removed. This substantial increase in expected desilting maintenance would significantly increase impacts to pools and other important geological features on the streambed compared to the baseline conditions which include far less desilting maintenance. The conclusion that future sediment removal "would not have any impact on geological resources" is incorrect considering the figures cited above. Please refer to discussion of Impacts of Increased Maintenance below.

Comm 17-58

Replacement of sloped and vegetated banks where they still exist with vertical walls (i.e., at the north east bank of the estuary) is a significant geological impact because it permanently alters a natural landform – the sloped vegetated bank – into a vertical concrete wall.

Comm 17-59

Residual Impacts
The preliminary conclusion of the DEIR/EIS that there are no significant geological impacts and no geological impacts at all, and that therefore no mitigation is needed is flawed. There are two additional examples that illustrate the potential for significant impacts. First, while stockpile areas are proposed to be essentially on top of or immediately adjacent to creek banks, no mitigation is proposed to keep soil out of the creek. Second, although work in the creek's flowing water is not to occur during December 15 through March to protect migrating steelhead, there are no mitigation measures to prevent erosion and siltation in the construction zone during storms, especially since excavation could still occur during these times next to the creek.

Additionally, a Biological Opinion written by National Marine Fisheries Service asserts that the proposed flood control project would not jeopardize the continued existence of steelhead in Mission Creek nor would it degrade designated critical steelhead habitat in Mission Creek. The biological assessments for gobies and steelhead have been revised to include recommendations from the resource agencies including NMFS, F&WS, and California Game and Fish. Extensive mitigation measures and environmental commitments have been identified in the biological assessments and the EIS/EIR to minimize impacts to the Federally listed species. Refer to Appendix A (Revised Biological Assessment) of the EIS/EIR.

17-41 We agree with the commentor that the estuary is an Environmentally Sensitive Habitat under the Coastal Act. Where possible, habitat buffers should be provided. However, the project will result in little change to the existing condition in regard to buffers. At present, there is little to no buffer on either side of the creek between State Street and the Yanonali Street Bridge. In most areas, development and/or urban plantings extend nearly to the creek edge. There will be some improvement as a result of the project, especially along the easterly bank immediately up and downstream of the Mason Street Bridge. A full habitat expansion zone will be provided in the portion of property at 15 W. Mason Street that is not required for creek widening. North of the bridge, there will be an area of short toe wall and sloped riprap above, similar to the bank design further upstream. During final project design, the Corps will work closely with the County Flood Control District and the City to provide as much buffer as possible in this area.

Comm 17-60

Lastly, the greatly increased sediment removal (2,400 cubic yards (cy) per year) compared to baseline conditions results in greatly increased and significant impacts to geological features. In fact, the March 1991 Santa Barbara County Flood Control District Maintenance Program EIR (page 13.5-6) required specific mitigation for geo-morphological impacts from desilting south coast streams. Therefore, the geological impacts from desilting Mission Creek are also significant unless adequately mitigated. Since maintenance is part of this project, the mitigation of maintenance impacts must be included in the EIR for it to be legally adequate and for there to be accountability that the mitigation would occur for these impacts. There is no mitigation for geological impacts of desilting, however now there is evidence entered into the record from the Flood Control Program EIR that such actions cause significant impacts unless specifically mitigated. The Mission Creek Flood Control Project DEIR/EIS merely states that maintenance will have no impacts and included no analysis to support this cursory and inaccurate assertion. By contrast, the 1991 Program EIR (Attachment 2) included experts' studies of the impacts of desilting on geological resources. The DEIR/EIS is flawed in its conclusions considering the level of maintenance proposed (2400 cy desilted per year) compared to the levels of past desilting.

Comm 17-61

Water Quality

Incidental Sewer Line Breaks

On page 19-1, the DEIR/EIS states that the locations of utilities, including sewer lines, is approximate, and that some occur in the project construction right-of-way. The potential exists for an inadvertent sewer line break. Some of these sewer lines in the project areas are 6" to 8' in diameter and made of vitrified clay pipes. These pipes could be over 50 years old, but are under 100 years old. They are extremely fragile and can break if the soil around them is shifted or compressed. Please include a provision that all sewer lines in and adjacent to the right of way will be replaced with modern pipes, and provide additional mitigation in the form of training workers about the issue of sewer line breaks, and how to respond if it occurs. If known sewer lines are to be effected, their use should first be terminated so that they can removed cleanly, if removal is necessary or desired.

Comm 17-62

Water and Sediment Sample Analyses

These were taken in the dry season when pollution would be expected to be lowest, and apparently bacteria was not tested for. There are contaminants found in the sediment, including metals and oils that are problematic. Are these levels within standards for disposal at a landfill? Could runoff from stockpiles become somewhat polluted if the soils are polluted, and could this impact creek water quality? What measures can be implemented to prevent or reduce this impact? During or after maintenance, will the pollutants in the sediment become suspended and become water pollutants? If tens of thousands of cubic yards of sediment is redistributed in the channel as proposed each year to desilt fill scour areas, will water flowing over this sediment pick up its newly exposed pollutants and degrade water quality at all downstream? What is the standard for acceptable degradation in the coastal zone water quality? Is any deterioration acceptable? How can potential impacts from stockpile or potentially polluted sediment runoff be mitigated either as required by mitigated and as a good faith effort to keep the water clean?

17-42 See response to comment 17-30.

17-43 The proposed project does not affect views to and along the ocean. To the degree feasible, as discussed in Response to Comment 17-26, the project has minimized alteration to natural landforms. It could, in fact, be argued that the existing creek banks do not qualify as natural landforms. In addition, as noted in Response to Comment 17-30 above, there will be habitat expansion areas immediately above and below Mason Street. Finally, the Mission Creek Design Review Subcommittee (composed of members of the Historic Landmarks Commission, the Architectural Board of Review, the Parks and Recreation Commission and Planning Commission) will review the project during final design to assure that walls are treated aesthetically so that the views of the creek will be better than is the case now.

17-44 The Corps concurs; this is a false statement. Alternative's 2, 5, 7, 9, 10, and 11 do not yield net incidental benefits. Correction has been made in the EIS/EIR.

Comm 17-63 What units is Table 7.1-2 presented in?

Comm 17-64 Bio-filtration
Importantly, according to the Flood Control District as cited in the DEIR/EIS on page 7-1, vegetation is removed every few years. In fact, during the past three annual plans, vegetation removal was only proposed once, three years ago. The proposal to keep the entire bed free of vegetation is a substantial change in maintenance of the bed, but is cited in the DEIR/EIS as essential to maintaining design capacity. The EIR says it would be cleared of vegetation annually. Elimination of the herbaceous and immature woody plant species from the channel bed eliminates much of the channel's ability to filter the very pollutants identified in this section of the report. Please refer to the attached report on bio-filtration and the role of wetland and streambed vegetation, as well as bank and buffer plants, in reducing non-point source pollution.

Comm 17-65 By reducing the bio-filtration capabilities of the stream bed through greatly increased maintenance, the project indirectly and significantly degrades water quality. The channel bed must retain vegetation for effective break down and assimilation of pollutants. Currently there is a bad water pollution problem in Mission Creek. If vegetation is routinely sprayed in the creek, won't the dead vegetation add to bacterial counts? Will live plants help to reduce pollution? Does the current maintenance program allow for herbaceous plants in the bed? Does that provide for some bio-filtration>? Will that be lost or curtailed as a result of the new proposed maintenance program of keeping all vegetation out, essentially? What can be done to avoid this impact? Can the project include provisions for maintaining herbaceous vegetation in the bed until and only if it becomes a problem?

Comm 17-66 Mitigating Water Quality Impacts – Maintenance of Bed Vegetation
When a problem is as severe as water pollution in Mission Creek and the ocean, any worsening of that is a considerable contribution to the overall problem, especially since the City and County must clean up its waterways to comply with the Clean Water Act. Any loss of bio-filtration, then, is a significant contribution to water pollution. The project results in significant water quality impacts that can be mitigated through maintenance of vegetated beds instead of maintaining no vegetation. Please refer to the attached report for evidence that this impact would result and could be mitigated. It is an acceptable alternative and is consistent with the project objectives to allow for a higher threshold for desilting and vegetation removal, even if this reduces the design capacity of the creek to 3210 cfs or 2500 cfs. If it is necessary to mitigate significant water quality impacts to the maximum extent feasible, then allowing bed vegetation to grow is acceptable because the project objectives is to provide a 15 to 20 year level of protection.

Comm 17-67 Glyphosate and Increased Channel Maintenance
The proposal to increase maintenance duties and vegetation control in the channel will significant, especially since the bed will now be twice as wide. There will thus be even more roundup and rodeo applied to Mission Creek. This water quality impact is exacerbated by the loss of canopy trees, where they exist, the loss of bank vegetation, and the widening of the creek, all of which increase sunlight penetration to the bed. This will incur more plant

17-45 As spoken to in reply to question 28, and others with similar content, the re-evaluation of project impacts and incidental benefits which arise from mitigation features included since release of DEIS/EIR, the prospective wetlands and habitat expansion zone at the oxbow have been withdrawn wholly from the project description and analysis. The yield of environmental benefits anticipated from the alternative project designs is still highest for the recommended plan. Without including the property at the oxbow in any computations, aquatic habitat would have a net beneficial yield of approximately 0.35 HU, and stream bank habitat a correspondingly greater net benefit of approximately 0.6 HU. No residual impacts can be identified with implementation of Alt.12.

17-46 Although the existing views are inhibited by *arundo*, pampas grass and existing buildings that are part of the bank, there are also many skyline trees along the creek, many of them native trees. The City, County and Corps are working together to retain as many of the larger trees, especially native trees, as possible. While it will not be possible to save all of the trees, their loss will be mitigated by the planting of new native trees as part of the project. While there may be a short-term policy inconsistency, in the long-term, there will be as many, if not more, trees as there are now. The Mission Creek Design Review Subcommittee will also review proposed landscaping placement to assure that views are protected and enhanced.

17-47 The author makes a valid point. Chapter 10 now addresses the importance of physiological changes which occur in saline water. Additionally, the EIS/EIR now treats construction effects of the project as causing incidental impact to both steelhead

growth, especially since the bed is typically wet but not saturated along most of the project reach. These conditions will cause thick stands of willows and other plants, including herbaceous species to grow. These should be maintained. The County will have to remove the willows, and the proposal is to cut and spray this vegetation. As noted, there has only been time vegetation removal was proposed in the last three years in Mission Creek.

Comm 17-68 The proposed increase in herbicide use will significantly impact water quality in two ways. It will reduce the bio-filtration of the streambed and it will add glyphosate to the stream environment. In recent County creek water testing near Mission Creek, high levels of glyphosate were found. This substance or the surfactant it is applied with can be toxic to salmonids (steelhead). Addition of this substance to the creek environment and reduced bio-filtration are significant water quality impacts, however, the DEIR/EIS did not touch on these issues. The 1991 Program EIR for Flood Control Maintenance (page 13.6-3) identified significant unavoidable water quality impacts associated with spraying streambed vegetation, and recommended very specific mitigation measures for the impacts of spraying herbicides. The high level of glyphosate detected by the County is significant new information pointing to another significant water quality impact of increased maintenance as proposed.

Thermal Pollution

Comm 17-69 The failure to provide a canopy over the creek within 20 years, or so, coupled with the removal of existing bank vegetation and approximately 18 mature native trees (and an unidentified number of non-native trees) and the doubling of the creek bed width will greatly increase sunlight penetration to the water. One of the most life-threatening water pollutants is heat: the artificial warming of water. In this case it will be a result of sunlight radiation. While there is no canopy now over the entire creek, the creek is narrower and the banks are vegetated in some cases providing some shading. For a long time, there will be increased thermal pollution because of increased sunlight penetration. This will be especially true considering the removal of all bed vegetation, which also helps to shade the water. The heated water in Mission Creek will not support aquatic much life because it will too warmed, and this will impact the estuary, including trout in the estuary. How will increased temperatures impact steelhead if they are in the estuary or lower creek?

Comm 17-70 Related to this, the widening of the creek will also cause more sediment to drop out because the velocity will be lower. This is evidenced by the proposal to desilt 2400 cy of sediment from the channel each year, compared to far less in the three previous years (350 cy total). With increased sedimentation, will pool depth and formation be impacted? Will the estuary, once widened, act more like a sediment trap and reduce the depth of the pool in the lagoon, which would adversely impact water quality by increasing the temperature and possibly causing other adverse physical or chemical changes to the water? The BA for tidewater goby did not address the potential to lower the depth of the estuary pool by widening the estuary. It makes sense that if it is widened, more sediment will drop out there and the pool will become shallower. How would this impact water quality, steelhead smolts, and tidewater gobies?

and gobies. Appropriate mitigation measures have been included as well..

17-48 The description of Lower Mission Creek as lacking in suitable rearing conditions for steelhead fry come directly from field observations by National Marine Fisheries Service. Failure of any fry to come from the redds made by the well-documented female this past March seem to confirm that opinion.

17-49 The author makes a valid and most excellent point. To the extent horticultural techniques allow, every effort will be made to propagate *P. racemosa* from cutting taken from the trees at de la Guerra Street, Bath Street, the oxbow, and Mason Street. Successful vegetative growth of the larger two of the Mason Street stock is most desirable as those trees may, by chance, have genetic traits which predispose them to be more tolerant of saline ground water than sycamores from elsewhere in the watershed. Cuttings from this source would be planted into the two habitat expansion zones planned for the estuary.

17-50 Although the Moreton Bay Fig Tree at Chapala and Montecito Streets is not a native tree, it is an important tree for a variety of reasons. It is both a biological and a cultural resource. The potential impacts involved are primarily biological. Therefore, evaluation of potential impacts to the tree is included in the Biological Resources Section. Biological resources are not necessarily confined to loss of native species. Because of its size and condition, the Fig Tree has value to botanists. However, because it is also a designated Landmark, it is also included in the Cultural Resources Section. Because it is a skyline tree, it is also included in the Aesthetics/Visual Resources Section.

17-51 The DEIS/EIR acknowledge possible take of gobies during de-watering of the construction

Comm 17-71

Sedimentation
The proposed stockpile locations are adjacent to the creek bank, but no erosion control measures are proposed as mitigation. Similarly, the construction site will be exposed dirt, including the banks and bed. Although work would not occur in the flowing water, rainfall can carry the disturbed soils away as sediment into the creek with proper precautions. Also, the DEIR assumes to increase in turbidity as a result of increased maintenance, but this is inaccurate. See below. No mitigation is proposed for any of these sediment sources, so this impact remains potentially significant.

Comm 17-72

Future Periodic Maintenance
The document states that "It is assumed that future periodic sediment removal would be similar to the past... ." However, as noted, the DEIR/EIS refers to 2400 cy per year of desilting from the channel and redistribution of another several tens of thousands of cubic yards (cy) per year in the channel. In the past three years, the County has only removed 350 cy during its during implementation of its maintenance plans. Therefore, the document is very wrong on this point, and impacts are much greater than assumed. Impacts from increased maintenance are not limited to turbidity. They also include reduced bio-filtration, worsened thermal pollution, and increased glyphosate use.

Comm 17-73

The draft EIR/EIS failed to address bio-filtration, thermal pollution, glyphosate, sedimentation from the construction site and stockpiles, potentially contaminated soil runoff, and increased maintenance impacts on water quality. Its analysis of water quality impacts was quite incomplete.

Comm 17-74

Since, as proposed, the project would impact water quality, degrading further than it already is, this is a significant impact. On page 7-21, the DEIR/EIS points out that the project would cause a significant impact to water resources if it would be inconsistent with the local water quality regulations of water quality plans. We have established that the project degrades water quality, and thus that the LCP policies would be violated. Also, since LCP Policies for water quality protection require maintenance or enhancement of water quality, this project would violate the LCP and Coastal Act. These serious policy conflicts are impacts under CEQA in the Land Use Section, and should be evaluated there, and classified as significant because of how numerous and serious they are.

Comm 17-75

Compliance with Environmental Laws and permit Requirements Section 7.6.5
This section fails to recognize the Coastal Act and LCP requirements for no degradation of coastal water quality (PRC Section 30233). The 404(b)(1) analysis was based on a flawed assumption: that the only practicable alternatives were in the DEIR/EIS. In fact, other options not in the document are feasible, and more options can be made feasible through creative, legitimate use of the RDA funds for Lower Mission Creek. Since other less damaging practicable alternatives exist that degrade water resources less, the 404(b)(1) finding reflect this. To comply with the Clean Water Act, this project must be the least damaging practicable alternative. It is not. Please refer to discussions in Alternatives.

exclusion in the estuary. Mitigation for that possible impact has now been included. The consequences of implementation of the proposed project is, properly, the opinion to be written by the Fish and & Wildlife Service. National Marine Fisheries Service has already completed a Biological Opinion regarding steelhead (please refer to Appendix A).

17-52 Please refer to reply 17-48.

17-53 In our approximation, there is about 5240 LF of existing hardened banks and 2060 LF (oxbow reach and bridge culverts excluded) of unprotected banks along the project where bank stabilization is anticipated. Roughly 1820 LF of the stream bottom is hardened in some form or another. With the project in place, 4480 LF of the vegetated riprap-toe wall bank and 2395 LF of full height vertical walls would be built. All 1820 LF of hardened streambed would be removed and replace with natural bottom.

17-54 The EIS/EIR indicates that the geotechnical report is in the Main Report as Appendix B. A review of the Main Report indicates that the Geotechnical Study is part of a set of Technical Appendices that is available under separate cover. The Technical Appendices are available at the City Planning and Public Works offices, County Flood Control offices and at the Corps. They have been available since the beginning of the comment period on December 27, 1999.

17-55 Through an error, the Initial Study was not included in EIS/EIR Appendix I, although the Notice of Preparation was included. The Initial Study is now in Appendix I.

Comm 17-76

This section of the DEIR/EIS (Section 7.6.5) includes a statement that, "For the life of the project, impacts related to the future maintenance are included in the EIS/EIR." What is the life of the project? The project description does not specify this, and it id not in the document. Is it 50 years, or 20 years? This effects the amount of impacts to the creek, the amount of vegetation and silt removed, etc. In contradiction of the report and the HEP, the longer the project life, the greater the maintenance impacts. Impacts that are repeated periodically or annually must be tallied, rather than treated as one ongoing impact. After tallying the repeated impacts, how many cumulative acres of streambed will be desilted and / or sprayed during the life of the project?

Comm 17-77

As noted in the DEIR/EIS, there are stockpile and staging areas "at the edge of the creek on the east and south." (DEIR/EIA at Page 10-28) There is no erosion control planned for stockpiles and for staging areas.

Comm 17-78

Water Quality Mitigation

The following measures are needed to reduce significant impacts to the maximum extent feasible:

1. All of the mitigation measures for water quality in the 1991 Program EIR for maintenance;
2. Containment of stockpiles and placement away from stream banks;
3. Specific plans for control of polluted runoff and sediment from staging areas;
4. Location of staging areas away from creek banks;
5. Testing of desilted material for proper disposal;
6. Maintenance of significant areas of herbaceous vegetation in the stream bed during desilting;
7. Reduce or eliminate use of herbicides; have crews cut vegetation or uproot annually for use in habitat restoration projects if possible;
8. Extend banks further into channel to increase bio-filtration on banks and to promote canopy trees to reduce thermal pollution. This will reduce project capacity, but will meet the written project purpose of providing 15 to 25 years of protection from floods;
9. Reduce maintenance frequency by tolerating a higher level of silt and vegetation (herbaceous) in the bed. This will reduce operational capacity, but will fulfill project purpose, and is needed to reduce significant water quality impacts to the maximum extent feasible.
10. Use RDA funds to remove blight (structures) from riparian fringe. This will enable banks to be laid back more for buffering surface runoff into creek, and will expand buffer area beyond what is proposed, reducing non-point pollution.
11. Evaluate the biological impacts of and the benefits and feasibility of pumping tertiary treated water into the creek at different locations. Implement if water quality would benefit and biological resources would be preserved.
12. Prohibit all work in creek channel between 12-15 and 4-15 of each year.

17-56 Creek pools are not usually considered significant geological features. In addition, while they are not common in Lower Mission Creek, there are several pools further up the creek, as well as on other creeks in the City, especially Arroyo Burro and Sycamore Creeks.

The pools found along the project reach are created mainly along bridge culverts, which in some cases can not be allowed to exist without risking the stability of the structures and thus, are filled in during maintenance. The fish ledges and side baffles included as mitigation measures are expected to create numerous pools without risking any structures.

17-57 Based on the additional sediment investigation performed to date, the expected sediment deposition along the project reach is expected to be similar to existing conditions. Please see Section 10.5 of the EIS/EIR for the analysis of sediment budgets expected for Alt. 12. The additional sediment analysis compared like events during current conditions and during conditions with project in place. The expected difference in deposition between existing and future with project conditions for the annual average, 5-year, and design (3400 cfs) events are 25 cy, -35 cy, and -385 cy respectively. Based on this comparison, it reasonable to expect that the future with project sediment related maintenance would be very similar to current requirement similar to County's current activities. Corrections have been made to the EIS/EIR based on the results of the additional sediment analysis.

Comm 17-79

Residual Impacts

The DEIR/EIS did not address many of the water quality impacts, and underestimated the maintenance impacts. Maintenance impacts can be significant, according to the Program EIR. Therefore, mitigation is required. Implementation of all of these measures may reduce water quality impacts to less than significant, but would not prevent some degradation. Any degradation conflicts with the LCP and Coastal Act. Alternatives that do not rely heavily on widening and maintenance, for instance the new 2500 cfs option presented in this letter, could foster a canopy in a timely manner, avoid the need to desilt and spray herbicides frequently, and comply with the Act, but the proposed project does not comply.

Comm 17-80

Air Quality

The finding that the project would not have a significant impact on air quality is predicated upon and assumption that disposal can occur at Tajiguas. This assumptions is dangerous because Tajiguas has only five years of emergency bench-fill capacity remaining and there is no approved or proposed new disposal site. Under the mandatory reasonable worst case scenario, disposal may have to occur elsewhere, such as in another County, and this would increase air pollution and potentially exceed Thresholds of Significance.

Comm 17-81

Biological Resources

The project will impact biological resources below the Cabrillo Bridge, but the DEIR/EIS excludes this area from resource discussion and impact assessment.

Comm 17-82

Creek and Estuary Buffer

How much will the buffer from top of bank to the existing and approved developments be reduced by? Will the project place more structures within 25 and 50 feet of the bank top? How many? Please evaluate the biological impacts, including water quality impacts, of a reduced creek buffer. Refer to the attached report from the Riparian and Wetland Restoration Working Group for evidence of the biological and water quality benefits of buffers.

Comm 17-83

How has the City, in its approval of other projects, considered this creek widening in determining the final buffer size? The approximate design of the flood control project was known, including specifically which side and about how much the creek would be widened, when the La Entrada project was reviewed and approved. The City cannot claim that the flood control design was speculative. The City approved the La Entrada project knowing, or with the information to know, that the combination of this project and the flood control project would eliminate the buffer around the estuary, habitat for listed steelhead and gobies. We have overlaid the La Entrada Plans with the Flood Control plans, and they eliminate the estuary buffer. How will the flood control project, by reducing / eliminating the riparian buffer, impact the estuary and the species that live in it?

Comm 17-84

With a smaller buffer, will it be easier for people to dump refuse and plant material in the creek since people will be closer to it? This could facilitate the introduction of non-native plants. As mitigation, the buffers should be wider by narrowing the channel and extending the sloped banks lower. Flood control District should be required to maintain the banks free of non-native invasive species as part of maintenance.

17-58 No banks anywhere in the estuary have native perennials growing from them, and more over all have been altered substantially in the past by reteated realignment of the estuary. Banks there are not natural, but instead a man-made Aland form .

It is reasonable to assume that any lateral erosion of the bank along the subject reach would be reclaimed by the property owner and reclaim the bank to restore use of the parcel. Some might say that the landform in this area has permanently been altered by the close proximity of existing structures to the creek banks. Replacement of the bank with vertical wall would not have significant impacts on geological resources.

17-59 The contractor is required, under the Clean Water Act, to prepare and implement a Storm Water Pollution Prevention Plan using best management practices. This would include such measures as setting the stockpiles back from the creek and placing hay bales, silt fencing or other barriers between the creek and the stockpiles to control drainage. This would also apply to any proposed excavation. These are not geological issues, but water quality issues and are discussed in that section.

17-60 Based on the additional sediment investigation performed to date, the expected sediment deposition along the project reach is expected to be similar to existing conditions. See Biological Assessment, Paragraph 5.6 - Sediment Budget. The additional sediment analysis compared like events during current conditions and during conditions with project in place. The expected difference in deposition between existing and future with project conditions for the annual average, 5-year, and design (3400 cfs) events are 25 cy, -35 cy, and -385 cy respectively.

Comm 17-85 To mitigate the loss of buffer, the City needs to propose, in the context of this project end document, a backyard tree program to foster the planting of riparian species along the creek in private properties. Without this mitigation, the loss of buffer area is a significant biological, water quality and visual impact.

Comm 17-86 Widening of Estuary
The DEIR/EIS states that widening the estuary will provide more habitat for tidewater gobies. However, by widening the estuary, velocities will drop, and sediment will fall out. This is a well-known fluvial hydrology principal. If sediment falls out in the estuary more than it used to, what will be the increased maintenance impacts in the estuary? Will or might it need to be dredged?? If so, what are the impacts of dredging?

Comm 17-87 Also, if sediment builds up here, then how will this impact estuary pool depth? Will the lagoon be wider, but shallower? If so, what impacts will this have on gobies, steelhead, water quality, water temperature, human access/impacts and other resources and issues? The EIR notes that 2400 cy of sediment would be removed, a substantial increase in annual desilting. This points to an increase sediment deposition in the creek and estuary, and reduced pool depths there.

Comm 17-88 There has been no scientific (fluvial hydrological) assessment of how widening the estuary may reduce its depth. This was not addressed by the BA for steelhead or tidewater gobies, and is not addressed in the DEIR.

Comm 17-89 Widening of Creek
If the creek is widened, how will this effect sedimentation. The DEIR "assumes" that maintenance will be the same as in years past, but then estimates that 2400 cy of sediment will need to be removed per year, a huge increase in maintenance. This increase in sedimentation will fill pools and riffles, covering unique geological features which support biota. The potential loss of pools from creek widening and increased sedimentation is a significant impact not addressed in this report.

Comm 17-90 Widening the creek will also increase thermal pollution, will warm water, and degrade water quality. Warmer water, up to a point, allows bacteria to thrive for longer. Warmer water impacts the fish and other species adversely. This was not considered. How would thermal pollution impact biota? The creek would be wider, there would be extensive vegetation removal on the banks, including native and non-native shade trees. The invert would be kept clear of vegetation. This would increase sunlight penetration and heat the water. In 20 years, this significant impact may be reduced.

Comm 17-91 Widening would also increase maintenance by increasing sunlight and vegetation growth, and sedimentation. Please refer to discussion of increased maintenance.

Comm 17-92 There is no scientific analysis (fluvial hydrological or fluvial geo-morphological) of the impacts of creek widening on pool depth and sedimentation. However, it is well established

Based on this comparison, it reasonable to expect that the future with project sediment related maintenance would be very similar to current requirement similar to County's current activities. Corrections have been made to the EIS/EIR based on the results of the additional sediment analysis.

17-61 Utility relocations replacement if needed to allow for construction of the project, would be performed. Appropriate replacement materials would be used.

17-62 The Watershed Characterization Study sampled Mission Creek on the following dates: August 31, 1998; September 5, 1990 (to measure the first flush samples following a storm, January 28, 1999 and March 16, 1999. Given that the September sampling was completed immediately following a rain storm and there were two samples during the normal wet season for Santa Barbara, the commentor cannot claim that sampling was only done during the dry season. High levels of bacteria were most definitely noted and are outlined in Section 7.2.

In reference to the comment regarding appropriateness of the timing of sampling activities and the sampling results, the following response is offered. Sediment samples were taken during low flow conditions because it is under these conditions that pollutant levels would be most concentrated in the sediments. High flows have a tendency to wash the sediments and actually lower pollutant concentrations of even. Water samples were taken as specified during low flow conditions as well as immediately after the first storm of the season in an attempt to catch "first flush" pollutant runoff. As indicated in section 7.2, the County and City of Santa Barbara sampling effort tested for both Fecal Coliform and Enterococcus.

that widening reduces velocity and causes sediment to drop out of the water column. This will increase impacts on the bed compared to current conditions.

Comm 17-93

Habitat Expansion Zones

These areas are smaller than is stated in the document, which has contradictory information. They total .36 acres, if they are all available, however the DEIR states that they range in size from, .03 to .56 acres. (note: the EIR states that there is some question as to the availability of these areas for expansion zones.) Since the EIR states that they may be unavailable, these expansion zones can not be counted towards beneficial impacts or mitigation. Reliance in the HEP on these areas is also problematic. If they may not all become habitat, or if they are not valuable habitat due to park uses, then this throws off the simplified HEP's conclusion that habitat will be bettered overall.

Comm 17-94

We suggest that these areas be designed in the following way: Narrow the channel bed width at these locations, but create a broad low floodplain above the low vertical wall, then have another bank on the outer edge of the expansion zone. This floodplain restoration will provide passive recreation, but would be a more natural setting that would be subject to periodic flooding and riparian processes including succession. By providing the broad floodplain, capacity at these sites may be increased, or offset by narrowing of the channel. Additionally, the expansion zones would "capture" and detain some flood waters, potentially reducing slightly downstream flood elevations.

Comm 17-95

These habitat expansion zones should be planted with native trees and understory, all from locally collected seed and/or cutting stock. At least 100 large trees should be established in these areas to create a dense woodland. Thus, 200 should be planted and maintained with the expectation that up to half may die.

Comm 17-96

On page E-3 of the DEIR/EIS, the availability of the habitat expansion zones is called into question, thus any finding regarding biological impacts predicated upon availability of these areas is flawed. According to the DEIR, the project sponsors and Corps have yet to "determine the availability of all five of these parcels." According to the DEIR, "If these areas are available, each would be designed ... ." Therefore, these areas are in question according to the DEIR, and, in addition to the other reasons outlined in this letter, they cannot be used to justify a finding of no significant impacts.

Comm 17-97

Impacts to Streambed versus Impacts to Banks

The HEP finds that aquatic habitat in the bed will be degraded from .80 habitat units to .30 units, largely due to increased maintenance. Bank vegetation and habitat values would rise though, offsetting the significant impact to the bed habitat, according to the DEIR. However, when a project results in significant impacts to one resource (aquatic habitat) and a beneficial impact to another (reportedly bank vegetation), the lead agency cannot blend the two impacts to find that the overall impact to habitat was (reportedly) positive. Instead, CEQA requires that the significant impact be identified in its own right separate from any reported beneficial impacts. The City and Corps cannot blend the impacts to two distinct resources and claim that, on par, there is a net gain. Significant adverse impacts stand alone, and the must be

The concentrations of metals and non-metals and of petroleum hydrocarbons and oil and grease were well below action thresholds that would require remedial action.

In reference to the comment demonstrating concern that stockpiled soils could erode and contaminate Lower Mission Creek, the following response is offered. Stockpiled soil needs to be placed sufficiently far back from the creek that erosion control measures can be employed. The Corps intends to employ Best Management Practices (BMPs) to control erosion and associated sedimentation of the creek. Measures such as use of sediment control mesh and covering of stockpiles are among possible BMP's that could be employed to protect the creek. A Storm Water Pollution Prevention Plan (SWPP) will be prepared by Corps or the Construction Contractor, which would include methods or conditions for erosion control occurring due to the project construction. This document would be available on the construction site.

In reference to the comment demonstrating concern that maintenance activities could adversely affect the creek water quality, the following response is offered. The effects of maintenance activities within the creek are unknown. Sampling in Lower Mission Creek has shown that turbidity typically increases within the creek during high flow events and then rapidly returns to lower concentrations when flows subside. Maintenance activities will be timed to coincide with low flow periods and BMPs will be employed to avoid excessive impacts to water quality. These BMPs will depend on the alternative selected as the project.

overridden if the project is to be approved. Therefore, the finding of no significant biological impacts is flawed because it is based on blending a reported positive impact with a significant adverse one.

Comm 17-98

Constructed Wetland

This project feature is not a reliable possibility. The DEIR notes that the site is contaminated and that clean up may not proceed in a timely fashion to allow construction of wetlands. Since this is the case, the DEIR/EIS is flawed to promote this as a valuable project benefit: a new .6 acres of wetlands. This benefit cannot be counted since it is clearly too speculative and riddled with uncertainty.

Comm 17-99

Also, this area will not function as wetlands unless extensively maintained as such. This would entail regular vegetation removal and desilting. This would not be a functioning healthy wetland: it would essentially be a sedimentation basin that may accumulate some riparian vegetation on the banks. Further, it is proposed that an access road go right through this "wetland" area. This would degrade it further. It thus cannot be relied upon as a project benefit or mitigation.

Instead, the City and Corps should propose a floodplain restoration project (please refer to Dr. Riley's attached memo) in which it is excavated as a wetland initially, but is allowed to accumulate sediment until it is transformed into a riparian habitat adjacent to the creek. It should not be maintained. This could add some value to this particular site, but it is right next to the freeway, and would not be great habitat as a result.

Com 17-100

The HEP relies on this wetland to find that the project results in habitat improvement (an assertion we disagree with). Without this wetland, but with all other improvements including the habitat expansion zones which as noted are of questionable reliance, there is an insignificant increase in habitat value, according to the simplified, modified HEP. However, due to the simplified nature of the HEP model, this increase is so negligible, that it really is a break even. There is no improvement in habitat absent the wetlands that cannot be relied upon because its unlikely they would be built.

Com 17-101

HEP

Fails to Address Temporal Impacts to Habitats

Continuing along this line, the HEP was flawed in finding that there would be an improvement in habitat. Importantly, the HEP determined that after the trees matured, excluding the speculative wetland, there would be a negligible .04 increase in habitat units. Therefore, the HEP does not allow for identification of temporal impacts to habitat. If it is going to take 30 years (HEP at page 15) to break even in terms of habitat (a 1:1 replacement ratio for habitat values) then there are significant temporal biological impacts that are not mitigated. Therefore, as a qualified biologist, I contest the HEP finding, methodology and the DEIR preliminary conclusion of no biological impacts.

In reference to the comment inquiring as to applicable water quality standards, the following response is offered. Applicable water quality standards are referenced throughout Section 7. No separate water quality standards are known which apply specifically to water quality within the coastal zone. It is unclear as to exactly what boundaries the commentor is referring to when referring to the coastal zone.

17-63 The units are supposed to be Abacteria per 100 ml of water. This addition will be made to the table.

17-64 The revised maintenance for the creek would now allow the mosaic removal of stream bed vegetation. Mowing equipment, a brush hog, or similar machinery would be use to mow vegetation on half of the creek bed every year on an alternate basis. The mower would pass a foot and a half or more above the surface and side baffles with the intent of cutting back and stunting perennials, such as willows or white alders. Reasonably large herbaceous plants and annuals would not be mown. Systemic herbicides, such Roundup™, would be used only as a last resort, in highly specific applications rather than being applied indiscriminately to large areas, probably against rampant giant reed or similar invasive pest. See Section 10.6 of the EIS/EIR.

Com 17-102

Reliance on Habitat Expansion Zones and Constructed Wetlands
The HEP relies on the habitat expansion zones even though the DEIR/EIS states that they may not be available for riparian habitat (page E-3). It relies on the constructed wetlands, but acknowledges the speculative nature of this feature. The EIR determines that without the wetlands there would be a .04 increase in habitat values over the long term. This is a break-even proposition, except that habitat resources are impacted significantly until the landscaping matures.

Com 17-103

Genetic Value of Sycamores
The HEP failed to address the biological values of the existing mature sycamores. These trees predate the arrival of non-native sycamores and are thus unique representatives of the true sycamore strain native to this area. There are not many trees that are this old, and that are thus genetically important. Loss of this genetic information will be significant as a biological impact. The HEP did not factor in this value to the existing habitat, and thus determined that the project could improve conditions.

Com 17-104

Expansion of Estuary
The HEP relied on expansion of the estuary channel for increased habitat values. However, by widening the estuary, a strong argument can be made (and there is no science to dispute this) that the pool depth will drop. Thus, the volume of the estuary may not be increased, even if the surface area of it is. By doubling the size of the estuary, the project does not necessarily double the habitat value of it. If sedimentation becomes an issue in the estuary, and maintenance is needed, this will further reduce the habitat value of the estuary, even if it is widened. Studies are needed to illustrate what will happen to the estuary if it is widened, but instead of studies, the HEP and DEIR rely on assumptions that the habitat value would be improved.

Com 17-105

On page 10-17, the DEIR/EIS speaks to sudden water temperature changes. On page 10-18, it says that this can impact organisms with low tolerances to such fluctuations. Steelhead a re one of many such species. Changes in the depth of the estuary from widening it may induce temperature rises because shallow water heats faster than deeper water.

Com 17-106

Arundo Removal and Recolonization
The HEP relies on the removal of *Arundo donax* from the creek as an improvement, which it is, but without maintenance of the banks, this species will recolonize the area, and in the long-term without maintenance of the banks, the habitat values will drop due to *Arundo's* re-establishment.

Com 17-107

Future Maintenance
The HEP states that "It is not expected that future maintenance would cause additional impacts." However based upon the foregoing discussions, future maintenance would increase. Desilting would be 2400 cy per year removed from the creek (compared to 350 cy removed in last three annual maintenance plans). Furthermore, vegetation removal will increase also as noted in the DEIR. The bed will be kept free of vegetation under the proposal as described in the DEIR, whereas under current maintenance, vegetation removal has only

Bio-filtration. The Corps is well aware of the literature regarding bio-filtration and its potential applications in varied situations. As stated, the purpose of the project is flood control, not creek water remediation. The carrying capacity of the channel must be sufficient to eliminate the flood damage and risks to human life that has occurred in the project area of lower Mission Creek. Small herbaceous aquatic vegetation will not substantially affect the water carrying capacity of the channel. This type of vegetation also recovers rapidly subsequent to severe disturbances such as severe flood events and possible maintenance activities. Thus it is likely that whatever bio-filtration benefits occur with this type of vegetation, will continue.

Woody vegetation such as willows and *Arundo donax* and large herbaceous vegetation such as cattails and reeds must be kept from colonizing the creek channel.

17-65 See response to comment 17-64.

17-66 The author correctly identifies one important and valuable function of extensive vegetated beds or wetlands within the channel. Regrettably, a design which would exchange some fraction of the intended conveyance capacity for such biological filtration properties would no longer satisfy the economic requirements for Federal participation. The City of Santa Barbara would be left entirely to its own resources to pay for a lesser amount of flood control.

Com 17-107 cont

occurred once in the last three years on parts of the project reach. Therefore, according to the DEIR, although it does contain contradictory information, and based on review past Annual Plans and statements in the DEIR by Flood Control Staff, there will be increased maintenance and increased impacts o habitat from maintenance. Thus, the HEP's statement that maintenance (and associated impacts) would not be increased is false and it effects the quality and conclusions of the simplified HEP.

Com 17-108

Treatment of Maintenance Impacts
On page 14, the HEP as part of the DEIR, finds that the project "would have no additional impacts to aquatic habitat beyond those arising from initial construction." EDC takes issues with this finding and approach used to make it. This discounts the impacts of all future maintenance. Future maintenance, which as noted in significantly increased over baseline conditions, will remove the early stages of succession in the riparian community year after year for the project life. This is 20 or 50 (depending the "project life") repeated removals of establishing riparian vegetation. This is an impact each time it occurs. The HEP assumes that the channel can be kept free of habitat values, but this is unrealistic. Plants will begin to grow quickly in the channel after maintenance. So each repeated maintenance episode will have its own impacts. However, the HEP ignores the impacts of future maintenance, and this helps to justify the DEIR's conclusion of no impact to biological resources.

Com 17-109

Type of HEP, Blending of Impacts to Mask Significance
The HEP used is an oversimplified "modified and abbreviated form" of HEP. The HEP groups all biological resources into one impact category, finds, based on flawed assumptions that the project will benefit the habitat (but only after the trees mature). By not analyzing specific impacts to biological resources separately, for instance the aquatic versus riparian bank habitats, the HEP facilitates the blending of impacts (significant and reportedly positive) and the EIR's wrong conclusion of no significant biological impacts. If, as other EIRs do, this one analyzed impacts to distinct biological resources instead of grouping them together, then a finding of significant impact would be evident. For instance, the substantial degradation of bed habitat is "offset" through balancing with the reported increase in bank habitat. This approach violates CEQA's mandate that significant impacts must be looked as individually, and cannot be blended with beneficial impacts to make the overall impact appear less than significant.

Com 17-110

HEP fails to Address Bio-Filters
The HEP and the DEIR/EIS did not address the decrease in bio-filtration that the project would cause, as discussed under Water Resources Impacts. Therefore, since bio-filtration can clean up water and improve habitat conditions, the reduction in it has the opposite effect. This will reduce habitat values in the aquatic habitat and estuary, but the HEP did not address this.

Com 17-111

HEP Does Not Address Impacts in Acres
There is no quantification of acres of impacts, although the Habitat Unit is calculated by using this figure. While, based on EDC's independent analysis, the project will reduce habitat values over the long run, as supported herein, the DEIR finds a 3% increase in units after 30

17-67 See response to comment 17-64. In addition, there are no safer herbicides than Rodeo™ and Roundup™ available. Information about Rodeo™ and Roundup™ is based on the current EPA approved label and Material Safety Data Sheet for the products. The active ingredient in Rodeo™ and Roundup™ is glyphosate, which inhibits the synthesis of amino acids and, therefore, inhibits cell growth and reproduction. These are non-restricted herbicides that are registered for use on aquatic (Rodeo™) and non-aquatic (Roundup™) plants. They can be applied by aerial application. The EPA label for Rodeo™ states: This product may be applied to emerged weeds in all bodies of fresh and brackish water which may be flowing, nonflowing, or transient. This includes lakes, rivers, streams, ponds, estuaries, wildlife habitat restoration and management areas and similar sites. The Roundup™ label includes similar language for dry land applications.

Glyphosate is strongly absorbed by soil. Glyphosate is stable in soil for varying lengths of time, depending upon soil texture and organic matter content. The average half-life of glyphosate in water varies from 35 to 65 days. In water, it is absorbed in bottom or suspended sediment particles.

Glyphosate is rated by the EPA as Apractically non-toxic (i.e., requires concentrations in water over 100mg/l) for the following aquatic invertebrates and fish: *Daphnia magna*, mysid shrimp, grass shrimp, fiddler crab, sea urchin, carp, bluegill, sunfish and minnow. It is only slightly toxic (i.e., requires concentrations between 10 and 100mg/l) for rainbow trout and oyster larvae. There is a very low potential for the compound to build up in the tissues of aquatic invertebrates or other aquatic organisms. Acute toxicity in trout

years. The area of impacts, including the area of increased and repeated maintenance, should be provided.

Com 17-112 *HEP - Conclusion*
The HEP contains many flaws and excludes many considerations, as noted above, that undermine its usefulness as an analysis tool. Based on the flawed, simplified HEP, the DEIR/EIS finds that significant impacts to biological resources do not exist and that the biological impacts are beneficial. This is not the case for the reasons outlined above. The project results in significant impacts to biological resources, each of which must be mitigated to the maximum extent feasible. We recommend that additional restoration (removal of concrete, stabilization and revegetation) upstream from Carrillo occur to mitigate this impact. The cost of this necessary mitigation must be factored into the b:c. Optionally, the City could disclose the RDA's $2.5 million in the DEIR as it must, and use some of this money to remove blight (with the incidental benefit of mitigating project impacts). This would preserve b:c and would provide necessary mitigation of significant impacts to biology.

The HEP without the constructed wetlands (but with the speculative habitat expansion zones (hez)) results in a break-even habitat after 30 years. But it does count the hez, which may not all happen, it does not count maintenance impacts or bio-filtration, it assumes an improved estuary, and it fails to consider temporal impacts. Therefore, the project does not mitigate itself, and habitat values will be lower after project construction, even after 30 years considering these other factors that the HEP excluded consideration of. The HEP assumes that the increase in Habitat Units of .04 overall (a 3% increase) is a benefit. But, considering the simplification of the HEP, and inherent problems with these types of habitat assessment tools, a margin of error is needed. Therefore, the HEP conclusion of .04 more units is essentially break-even after 30 years. The DEIR does not address these temporal significant impacts. The HEP fails to consider certain impacts, including maintenance impacts. The end result is reduced biological values, a less than 1:1 replacement of habitat values, even over the long term. Therefore, mitigation of the significant individual biological impacts to the maximum extent feasible is necessary to comply with CEQA.

Com 17-113 Non-native Trees
The DEIR fails to list, identify or discuss the loss of non-native trees. The document does count the native trees that may be impacted, although this number is a real rough estimation, but it fails to address non-native trees, which can provide habitat. How many non-native trees are being replaced?

Com 17-114 Steelhead
The DEIR/EIS claims that this species will not be impacted at all, but it wrongly assumes that steelhead would only be in the creek between December 15 and March. This is false, Steelhead can and have over-summered in Lower Mission Creek (including two adults at Isle in 1998 (and they can rear in the lower creek, too).

Com 17-115 The fish in this creek are steelhead, as found in the DEIR/EIS. Planted fish in Rattlesnake Canyon did not fare well and died off. They were not the ancestors of the fish there today.

and bluegill were observed with 96-hour (4-day) dosages of over 1,000 mg/l.

Glyphosate is non-toxic to birds, mammals, and bees. Acute oral toxicity (LD_{50}) in mammals is over 4,000 mg/kg, while acute dermal toxicity in mammals is over 800 mg/kg. Glyphosate is slightly toxic to wild birds. The dietary LC_{50} in both mallards and bobwhite quail is greater than 4,500 mg/l.

The comment letter included two scientific studies on the effects of glyphosate on salmonids. In the first study, toxicity (LC_{96}) in various salmonids and rainbow trout was observed at glyphosate concentrations of 10 to 200 mg/l, depending upon the mineral composition of the water. The threshold concentrations from this study were used, in part, to develop the EPA thresholds for glyphosate-based herbicides. The second study examined the effect of a marker dye on salmonids when mixed with glyphosate-based herbicides. This marker dye is not used in local applications. As such, the results of that study are not applicable.

The comment letter indicates that glyphosate was found in high levels in Mission Creek. The City reviewed the preliminary results of 1999-2000 sampling for various south coast streams. Concentrations of glyphosate were typically less than 0.05 mg/l. This value is significantly lower than the threshold concentrations for acute toxicity.

The application of Rodeo™ to control emergent vegetation or Roundup™ to control other invasive vegetation is not expected to adversely affect steelhead, other fish, or pond turtles for the following reasons:

Com 17-116 The steelhead could be impacted by future increased maintenance including desilting, sediment redistribution (approximately 20,000 cy/year) and herbicide application. Glyphosate and/or the surfactant used in their application (Rodeo, Roundup) are toxic to steelhead, and are beginning to show up in streams maintained in this area. (Please refer to attached information regarding toxicity of roundup and rodeo constituents to salmonids.)

Com 17-117 The increased sunlight penetration and thermal pollution will adversely impact over-summer or rearing trout. Since steelhead can spend much time in estuaries and in fact depend on estuaries, the potential loss of estuary depth impacts steelhead adversely. The loss of buffer area impacts steelhead.

Com 17-118 The potential for increased sedimentation, as pointed out and established in this letter, threatens steelhead in over-summering pools and in the estuary, and in rearing areas, should steelhead use them. The DEIR/EIS is flawed because it did not recognize that steelhead can be in the project reach any time of the year, thus the finding of no impact, even if based on the BA, was flawed. The steelhead BA, on page 15, erroneously states that steelhead would not be present in Mission Creek in August through October, so maintenance would not impact the species. The species is present in the estuary during this time, and increased sedimentation may require maintenance in the estuary (dredging). Therefore, by failing to recognize the presence of steelhead in the creek during these times, the BA underestimated impacts to the species. As an example, there are steelhead adults and smolts and juveniles in the estuary of Arroyo Hondo Creek on an almost year-round basis. Therefore, since Mission Creek and Arroyo Hondo are similar, the Mission Creek estuary likely supports steelhead throughout the year. Also, by not considering the estuary as part of the critical habitat for steelhead (smolts) the BA is scientifically inaccurate.

Com 17-119 Section 10.1.5.2 fails to recognize the critical role of estuaries in the steelhead lifecycle. This is relevant because impacts to water quality, temperature and depth of the estuary impact the species. This can be at any time of the year. Please provide a brief, scientifically-based analysis of these potential significant impacts.

Com 17-120 On the same page, the author of this letter is cited as stating that "Mission Creek was evidently one of a limited number of suitable streams located south of the Santa Ynez River" for steelhead. This is not true. This is one of many creeks south of the Santa Ynez that supported steelhead. Please correct this inaccurate statement, because most sizeable streams in this region supported steelhead, not merely a few.

Com 17-121 Steelhead occur in this creek currently, reproduce here, and swim to the ocean. Another adult steelhead was seen in the harbor this year, near the mouth of Mission Creek.

On page 10-23, the DEIR/EIS states that rainbow trout are "also recognized taxonomically as *Oncorynchus mykiss*." Elsewhere in the document, it is recognized that steelhead and native coastal rainbow trout are one in the same. This latter explanation is accurate, while the

with herbicide. No herbicide will be directly applied to open water. The herbicide will be applied in a precise and controlled manner in accordance with the EPA label instructions. In most cases, application will be by hand, using backpack sprayers. However, where fecal concentrations are high, it may be necessary to spray by machine. Hence, the amount of herbicide introduced to the channel is minimal.

- The expected peak concentrations of Rodeo™ or Roundup™ will be below chronic and acute toxicity levels for fish and aquatic organisms and land-based fauna if the herbicides are applied in accordance with EPA label requirements and at the proper concentrations (i.e., 1%). EPA has approved the use of Rodeo™ in aquatic environments and Roundup™ in dry environments based on scientific studies. No adverse ecological effects are expected if the herbicides are applied in accordance with the label instructions.

A surfactant (e.g., Agri-Dex™) is applied with these herbicides to enhance their effectiveness by spreading and retaining the herbicide on the plant surface, and by promoting absorption. Surfactants are a blend of petroleum-based oils that reduce surface tension on the leaf surface. The do not exhibit toxic effects on fish, aquatic organisms or land-based fauna, and are greatly degraded in the aquatic and land environments.

17-68 Please refer to response 17-64.
Use of herbicides is strictly regulated in California. Applicators must possess an appropriate chemical applicators

former is technically true but makes it sound like rainbow trout and steelhead are different. In these streams, they are one in the same.

Com 17-122 At the bottom of this page, the Santa Barbara News Press is cited. "Small trout feeding . were identified by a specialist ... as steelhead." This fails to cite the rest of the article that referred to the "dozen or so" steelhead about 18" long in the creek, identified by a Fish and Game staff person. The size indicates steelhead, and that was only 15 years ago.

Com 17-123 Tidewater Gobies
This species is listed because it is endanger of going extinct. The project threatens to reduce the depth of the estuary and lower creek pools by widening the creek, reducing velocities and inducing sedimentation. Thermal pollution is also an impact of the project, as described above, and this could impact gobies. In combination with the proposed breaching, this project's impacts be exacerbated in some way. What studies have been done to analyze how the creek widening may adversely impact the species in the manner described above? What information is there to base a determination that the estuary and creek pools would be lessened on average, in depth?

Com 17-124 The assumption that since the creek would be widened, it would be better for gobies is not supported by analysis or science in the BA or DEIR/EIS. On page 10-49, the document states that habitat benefits for gobies in terms of more bottom surface area may offset impacts of construction. This is a significant impact if the number of gobies is reduced, or if the habitat is degraded. Considering the sensitivity of this estuary and the existing encroachments – which will be worsened, there are unusual circumstances that lend weight to a finding of significant impact in this habitat. Some 90% of coastal wetlands including estuaries have been destroyed, so the remainder are even more ecologically valuable. Impacts here are more severe than in a less sensitive area.

Com 17-125 Male gobies burrow into the sediments. Therefore it is infeasible to, as proposed, collect the gobies as one side of the estuary is dewatered to work in preparation of excavation and construction. This would result in a significant loss of the males – they would be left high and dry (see attachment regarding gobies in local estuaries).

Com 17-126 The project, by resulting in a restriction in the numbers of a threatened species, which is confirmed in the BA and DEIR, would trigger the CEQA Mandatory Findings of Significance (CEQA Guidelines Section 15065). Specifically, the project would kill tidewater gobies. This mandates a finding of significant biological impact under CEQA – regardless of the BA, which is an Endangered Species Act assessment, and regardless of the HEP, which improperly blends significant, insignificant, and possibly beneficial impacts to find no significant impacts to biology. Since there are significant biological impacts as identified in this letter, they must be mitigated to the maximum extent feasible or to less than significant. As described in this letter, there are additional feasible mitigation measures that can be implemented, and indeed that must be implemented to comply with CEQA. Incidental benefit from the RDA's $2.5 would be helpful if it helped cover some of these needed mitigation measures, while being used primarily for its purpose of fighting blight. The RDA approved

certification and adhere to all laws and regulations regarding application of these substances. Any use of herbicides to control vegetation along lower Mission Creek will be in strict compliance with the laws and guidelines associated with herbicide application in a riparian environment.

17-69 Willows should cast more shade over the creek within 2 to 4 years than that now present along most segments of the stream. Shading will not have to await formation of the canopy from larger trees.
The mosaic pattern of trimming potentially large plants while leaving intact herbaceous and non-obstructive vegetation is intended to preserve that very shading property as much as possible.

A recent study commissioned by the City clearly indicates water temperatures in June in the estuary are determined by the influx of saline water, not water coming down the creek

17-70 See response to comment 17-57. Calculations show that less sediment would accumulate in the estuary over the course of a year than occurs now. The depth of water in the estuary would not change even with the wider creek. There will be enough water in the ocean to maintain the water surface elevation in the estuary during tidal exchanges.

17-71 See response to comment 17-59. Refer to the revised Biological Assessment for construction schedule and the proposed environmental commitments to avoid and minimize impacts during construction activities. Material will be watered and covered to control erosion and will not be stockpiled within the creek bed. Project construction will occur section by section so stockpiles will be small. In addition, no construction will occur during the rainy season.

this money for just such a use, and additional mitigation of significant biological impacts is needed for CQA compliance.

Com 17-127 Pond Turtle
The reduction in pools from project construction, operation and maintenance, if not mitigated, is a significant impact as noted above. It would preclude the potential re-establishment of pond turtles in the creek.

Com 17-128 Animal Movement and Impact of Walls
Please analyze the impact to animals trying to move into and out of the channel in sections with low or high vertical walls. Can this impact be lessened by providing recesses in the wall? Consider creation of small pocket caves and ledges (6" deep) for bird nesting and small animal movement on the vertical walls. Would such pockets be feasible and would they reduce an impact or enhance the walls for wildlife?

Com 17-129 Bed Coverage
What is the impact (cubic yards, and footprint in acres) of the new concrete walls in the creek bed and banks?

Com 17-130 Genetic Value of Old Sycamores
The DEIR fails to address the biological values of the existing mature sycamores. Referring to them as isolated native trees, the DEIR finds their loss to be insignificant in the context of all biological impact. In addition to being a significant biological impact because of the loss of biomass, the loss of the trees results in more invisible impact. These trees predate the arrival of non-native sycamores and are thus unique representatives of the true sycamore strain native to this area. There are not many trees that are this old, and that are thus genetically important. Loss of this genetic information will be significant as a biological impact. The DEIR did not factor in this value to the existing habitat, and thus incorrectly determined that the project would improve conditions.

Com 17-131 As mitigation, the City must use the trees that absolutely cannot be avoided as cutting stocks, and should make hundreds of cuttings, with assistance from the Botanical Gardens or a professional nursery.

Com 17-132 Also to mitigate the potential loss of trees, the project should be redesigned. The proposal to use pilings to support the walls to protect houses (as opposed to inverted "t" footings) can be applied to saved these invaluable trees. Each tree is worth a lot ecologically and genetically, and using pilings or shifting the channel somewhat would avoid taking of them.

Com 17-133 City staff had informed the public that many of these trees could be avoided. The DEIR indicates that they will all or mostly be removed. How many are proposed to be saved, and how many could be saved by tweaking the design a little? How many could be saved by going with a 2500 cfs channel?

17-72 See response to comment 17-57, 64, 67, and 68.

17-73 See response to 17-57, 64, 68, and 69.

17-74 The impacts to water quality are identified in the EIS/EIR and the corresponding mitigation to minimize these impacts have been provided. The storm water pollution plan would avoid discharge of pollutants in the water. No construction would occur within flowing water, therefore no degradation is expected to the water quality. See responses to comments 17-64 and 17-68.

17-75 See response to comment 12-16 and 12-3. During the plan formulation constraints such as economics, rights-of-way, and existing structures were considered in the development of the proposed practicable and least environmentally damaging alternative. The recommended plan is the least environmentally damaging plan that satisfies the applicable criteria including economics among other things. Project features also include structural mitigation measures to minimize impacts to environmental resources.

17-76 In general, the Corps estimates that a flood control project such as this would have an estimated life of 50 years. Thus, both the economic and environmental analyses use this time line.

The Revised HEP analysis explicitly includes the mosaic pattern of plant trimming and periodic de-silting.

17-77 See response to comment 17-59.

17-78 As appropriate mitigation measures recommended would be included in the storm water pollution prevention plan.

Com 17-134 EDC proposes that the channel at and downstream from Mason can be shifted to the east (there will be no buildings in the way) to protect that valuable heron roost and huge sycamore that City staff indicated could be saved. Please respond.

Com 17-135 Biomass
The project would remove significant native biomass, the large sycamores and oaks. This impact cannot be reasonably mitigated over the short term. What is proposed specifically to reduce the loss of biomass – a stand alone impact? This points to the failure of the DEIR/EIS and HEP to properly include temporal impacts; they are overlooked and this is a major shortcoming of what is supposed to be a reasonably thorough impact analysis document

Com 17-136 Riverine Pools
Loss of the undercut concrete sills and erosion control structures is a loss of the most significant aquatic habitat type in Lower Mission Creek except for the estuary. The HEP and DEIR try to mask this significant impact by blending it with purported positive impacts, which is in violation of CEQA. However, the loss of these pools is a significant stand-alone impact based on their value to many forms of aquatic life, on their relative scarcity, and on their potential to support over-summering or trapped steelhead and to facilitate steelhead migration by providing resting areas. Placement of a smooth, vertical wall along 2.4 miles of creek bank will eliminate the opportunity for any undercut bank habitats to form, and will hinder the formation of other pools. Loss of the concrete sill undercuts further reduces any chances for pools to form. The channel will be too homogeneous to have the diversity of form and habitat type to support a diverse aquatic community. The "differential erosion and sediment patterns" will be eliminated, and the bed will be maintained of silt annually, further adversely affecting aquatic habitat structure and value.

Com 17-137 Yet the DEIR/EIS asserts that impacts from maintenance would not be significant, even though the DEIR/EIS states that sediment removal would be about 2400 cy per year, with another 20,000 cy distributed in the channel at scour points. These are substantial, individual, stand-alone impacts. Blending these impacts through the flawed HEP process with reported beneficial impacts to bank habitat values does not erase the fact that these impacts to aquatic habitat are significant, and must be mitigated to less than significant or to the maximum extent feasible.

Com 17-138 Significant impacts must be mitigated to less than significant if possible, or to the maximum extent feasible. Mitigation of this impact requires replication of these habitat types (e.g., pools and undercut banks). This can include use of lunkers, as proposed by the City during public meetings (though excluded from discussion in the EIR), the creation of overhanging banks along sections of the vertical walls, particularly where pools may form such as the outside of bends, and rock vortex weirs in addition to the only two rock energy dissipaters proposed. These two features do not mitigate the loss of pools or overhanging banks.

Com 17-139 How big will these rocks be? How big will the rock piles be? What size flows are they sized for, and how will they be replaced? This information may be in the maintenance plan that the

Item 1. It has always been the County's intent to include all applicable mitigation measures from the 1991 Program EIR for Creek Maintenance to this project. This is clarified in the project maintenance description.

Items 2 and 3. See response to comment 17-59.

Item 8. Nowhere in the Project Objectives discussed in either the Main Report or the EIS/EIR that make up the Feasibility Study is the objective stated of 15 to 25 year flood control. The Main Report states that the one of the objectives is to provide increased flood protection for the residents and businesses of Santa Barbara. One of the listed constraints is that the net economic benefits of the proposed project exceed project costs. In addition, the project must contribute to the overall National Economic Development (NED). This requires that the plan maximize benefits to the NED. See response to comment 17-2.

Item 10. See response to comment 17-5.

Item 11. Pumping tertiary treated water into the creek is beyond the scope of this project. However, as the City works to determine what will be necessary to improve the water quality of the estuary as part of developing alternatives to breaching the sandbar at the creek mouth, this approach may be considered.

Item 12. Construction work is already prohibited between December 15 and April 15 of each year. This provision will also be added to the maintenance plan.

17-79 See response to comments 17-5, 17-26, 17-33, 17-40 and 17-59.

locals sponsors are developing, but it is not in the DEIR/EIS, rendering the project description and impact assessment inadequate.

Com 17-140 In addition, the increased maintenance, including sediment redistribution in the creek (20,000 cy per year) and desilting, will impact pools as noted above. This impact needs to be mitigated. There is no detailed maintenance plan in the DEIR, although it states maintenance is part of the project and document. There is not enough detail about the maintenance to determine its future impacts, although information in the EIR and in the County Flood Control District's recent maintenance plans suggests that maintenance will be greatly increased. Thus a conclusion can be drawn that maintenance impacts on biology will be significant, especially since the 1991 Program EIR for Flood Control Maintenance identifies nineteen significant unavoidable impacts and 56 other adverse impacts to biological resources from routine maintenance. Coupled with the increased maintenance proposed, including the fact that the creek bed will be doubled in size, doubling the area to be maintained, these previously identified impacts apply to this project, since maintenance is part of this project and document.

Com 17-141 Also, vegetation removal will adversely impact stream geomorphology and aquatic biology because the channel bed will be less stable, thus pool and riffle sequences will not be able to remain established.

Com 17-142 These significant impacts of maintenance on pools and channel bed morphology must be mitigated. Redistribution of sediments must be minimized to avoid filling scour areas. Scoured areas have pools, and incidentally provide areas of greater capacity. It is a significant impact of maintenance to push a bunch of dirt around in the channel bed, repeatedly and seriously disrupting channel bed stability and aquatic habitat morphology. In addition to avoiding redistribution and desilting whenever possible, when it is necessary to remove sediment, then pools must be reestablished at appropriate locations to provide aquatic habitat, and should be secured with boulders to help stabilize and establish pools at strategic locations where they would be expected to occur.

Com 17-143 Breaching and Widening
The DEIR/EIS fails to analyze the combined effects of the City's creek mouth breaching program, which it has hired consultants to study and is pursuing permits for, with the flood control project. For instance, what will the biological and water quality impacts be of a creek mouth sandbar breaching program with a widened estuary. Will these factors combine to adversely impact estuary depth.

Com 17-144 What is the depth of the estuary now (a range)? What will the depth be after the creek and estuary are widened? How were these figures determined?

Com 17-145 Biological Resource Policies
The document states, on page 10-30, that "In the interim before a preferred plan has been selected and explicit details of project design have been formulated, these points of the City of Santa Barbara's environmental policies cannot be addressed. They will constitute an essential

17-80 If the disposal site in not available at the time of construction, an alternate site will be identified and appropriate environmental analysis will be performed.

17-81 The scheme for drying half the estuary at a time will still allow normal flows to pass by the temporary construction exclosure. Water should come and go as normal through the Cabrillo Boulevard bridge. There ought not to be any influence on the lagoon.

17-82 See response to comment 17-15.

17-83 See response to comment 17-30.

17-84 See response to comment 17-15. It should also be noted that it does not matter how wide the buffers are, the adjacent land use is what matters. There is no evidence that the width of the buffer makes a substantial difference in how much trash is dumped in the creek. It is worth noting that there are presently 87 structures within 50 feet of the existing top of bank. After project construction, including demolition of 11 structures, there would be 80 structures within 50 feet of the new top of bank.
Please see the revised maintenance plan. Invasive plants would be removed from the creek banks.

17-85 The backyard tree program has been added to the Project Description.

17-86 See response to comment 17-25.

17-87 See response to comment 17-25.

17-88 See response to comment 17-25.

17-89 See response to comment 17-25.

17-90 Please refer to response 17-69.

Com 17-145 cont

element of NEPA and CEQA documentation at a later stage of planning. For a preliminary determination regarding project consistency with these goals and policy [sic], see Chapter 4." To determine Land Use Impacts, specifically, conflict with adopted plans and polices (CEQA Guidelines Appendix G), more than a preliminary determination must be made. While the final policy consistency determination is up the decision-makers, the document needs to make more than just a finding of potential consistency or potential inconsistency, because as noted above, these mean the same thing. Based on this statement in the DEIR/EIS, it is evident that not enough detail exists in the project to determine policy consistency and environmental impacts.

Com 17-146

Title and Description of Alternative 12

Section 10.3.4.1 describes Alternative 12 as using a "predominant combination of planted rip-rap, vertical walls, habitat expansion zones, and wetland construction," but some of these features are potentially not feasible, and cannot be considered as part of the project. This descriptive title must be changed to delete the constructed wetland, as it is riddled with problems as noted, and to only include the habitat expansion zones if they are a proven feasible project component. The document notes that there is a question as to whether or not these areas are all going to be available for these zones, so counting them toward the project's habitat values is inappropriate until their availability are known.

Com 17-147

Cylindrical Planters

These features are unnecessary to establish plants, and add to the costs, taking away from other necessary environmental improvements. Mitigation identified in this letter is necessary to reduce significant impact, and will cost. This will effect the b:c ratio. So, using the money for the cylinders to pay for needed biological mitigation is appropriate. Trees can be planted right through the rip-rap.

Com 17-148

Rip-Rap

It is vital that the rip-rap only be 15" maximum in diameter to accommodate planting, and be only one layer deep on the banks as proposed by City staff and depicted in diagrams. If the rip-rap size or depth is larger, this will significantly hinder plant establishment, and would further increase project impacts.

Com 17-49

Willow Cuttings

Cuttings, in addition to being paced below the rocks, should also be planted deeply through the rip-rap, with the tops of the cuttings exposed. Will this area be wet enough to establish willows? How will they be irrigated. This impacts the success of planting. During maintenance, removed willows would be used for replacement of bank vegetation, or used in other restoration sites.

Com 17-150

Jute Netting

Jute netting or some kind of erosion control blanket should be placed over the soils and rip-rap to prevent erosion and protect small plants from soil erosion. This can also help keep weeds down.

17-91 Please refer to response 17-69 and 17-70.

17-92 See response to comment 17-25.

17-93 See response to comment 17-27.

Five remnant properties where habitat expansion zones would be built have changed since the DEIS/EIR. Please see Section 10.5 of the EIS/EIR The size of each was stated as approximate, and that has not changed. Revised HEP calculations of benefits from habitat expansion zones include only these five.

17-94 The habitat expansion areas unfortunately are far too small to act as floodwater storage and would have negligible consequence to water surface elevation. The slope on the expansion habitat areas would cover the entire parcel and could be terraced to allow more frequent inundation and still support some sort of recreational feature.

17-95 The appropriate number of trees that could be supported by the habitat expansion areas would be planted, monitored and maintained to ensure expected survivability as described in the mitigation monitoring plan.

17-96 See response to comment 17-27. The total acreage of the habitat expansion zone may vary somewhat but is not expected to create imbalance on its mitigation purpose.

17-97 The revised HEP projects net habitat benefits for both aquatic and stream bank habitats.

17-98 Please refer to responses to 17-28 and 1745.

Com 17-151 Topsoil
All soils placed on the banks must be free of weed seeds.

Com 17-152 Spacing of Trees
The 40 foot spacing is unacceptable from a riparian restoration perspective. There are numerous sycamores on Mission Creek that are ancient (120 years) that are located only ten to 20 feet from each other. There is no justification for this spacing. The EIR refers to the "openings through the foundation of the channel walls" and says that they cannot be too close. However, the tree roots will grow around this footing to the soils and water. Therefore, large trees can and must be planted closely together, and this will not impact the footings. The City has constantly told the public that the large trees will be closer together. Why isn't this in the DEIR?

Com 17-153 There should be trees at the top and bottom of the slope, including behind each other, so it is not just one row of trees. In rich riparian areas, large trees often grow very close, even almost out of the same point on the bank.

Com 17-154 Trees should be clustered, but designed to cover most of the creek bed in the future.

Com 17-155 Some of the trees need to be planted right next to top of the wall to encourage a canopy formation more rapidly. Please respond to each of these points.

Com 17-156 Source of Plants
All plants must be from native, local seed or cutting stocks. Sycamores should be grown from cuttings from the old trees to be killed to preserve the genetic character of local sycamore population. We support re use of 1-gallon stock because they can be locally collected plants, whereas 15-gallon trees would be hard to obtain from local stock. The order for these plants should be placed upon local project approvals, so that some larger trees are ready for post construction.

Com 17-157 Will revegetation occur concurrent with construction to reduce temporal impacts?
Please delete the wax myrtle (Table 10.1).

Com 17-158 Number of Trees
There are too few trees proposed for planting, and too low of a success criteria for the habitat expansion zones.

Com 17-159 There needs to be at least one tree on average every 20 feet with understory and willows between for this project to actually restore riparian habitat. There also should be trees high up, at the middle, and low on the sloped banks, for a total of more than 250 large trees on the banks (not including the habitat expansion zones, if they come to be, or the constructed "wetland.")

Com 17-160 The trees shall not be trimmed for aesthetics in the future, correct? This would reduce habitat values even more.

If this area is made available, then it clearly would provide valuable additional benefits to the project. It should be made clear that the benefits that would be realized from this feature are not included in the calculation of the required mitigation measures to offset project impacts.

17-99 See response to comment 17-98. The proposed access road has been relocated to the southerly edge of the property, adjacent to U.S. Highway 101. In addition, another access would be created from the other side of the creek, adjacent to U.S. Highway 101.

17-100 The habitat expansion zones are not problematic. They will be built if Alt. 12 is adopted. Increases of aquatic and stream bank habitat quality are credible, and conservative, and worth striving for.

17-101 The break even threshold would occur in 3 to 5 years. The Corps regards this as a temporary consequence of the project.

17-102 All of the habitat expansion zones, with the possible exception of the area immediately north of U.S. Highway 101 and south of Gutierrez Street, are included in the project description. See response to comment 17-32.

17-103 The author makes an insightful and highly pertinent observation. Revision to the EIS/EIR now addresses propagation of these genomes for planting within the project area and elsewhere within Santa Barbara.

17-104 Please refer to response to 17-70.

17-105 Please refer to response to 17-70. Water temperatures in the estuary would not be affected.

17-106 The maintenance plan calls for the ongoing removal of invasive non-native species.

Length of Sloped Vegetated Bank

Com 17-161 The DEIA on page 10-36 states that 1400 yards of the creek banks would be sloped. Is this 1400 on each bank, or 1400 total? In either case, it is too short a distance, representing only one- to two-thirds of the banks' length. The sloped treatment must be extended through the estuary to comply with the Coastal Act, as noted.

Com 17-162 If 1400 yards (4200 feet) were to be planted at 40-foot intervals this equals 105 trees. This is what the DEIR says. Therefore, the proposal is to revegetate only 1/3 of the total 2.4 miles of banks, .8 miles, unless a math error was made. This means that the sloped area is only along one-third of the total bank length. Thus 2/3 of the 2.4 miles, or 1.6 miles out of 2.4 miles of banks will be only vertical. This is a creek channelization project due to the extensive use of vertical walls.

Com 17-163 The mature trees can be avoided by using pilings to stabilize vertical walls instead of inverted "T" footings. Pilings also foster root growth in new trees.

Oxbow Bypass

Com 17-164 This feature must be designed to allow fish passage in case steelhead attempt to pass through it, for instance, if the main channel becomes blocked after a storm.

Com 17-165 This channel should be as short as possible, unless extending it to the estuary would benefit the estuary and creek. It could provide more buffer area if it enabled the creek to be reduced from 60 to 50 feet. However, this area, if a narrower estuary is biologically beneficial (prevents reduction in depth) must become a buffer, and not be parking lots. Extending the bypass likely has significant impacts on gobies and steelhead in the estuary, and the BA would have to be revised to address this project change. Therefore, unless evidence illustrating how extending the bypass would benefit the ecosystem, EDC would not support this concept. The only way to justify extending an artificial creek bypass in the coastal zone is to find that it would improve habitat, and we do not believe it would despite the fact that it may increase reduce the buffer width. In general, EDC does not support concrete channels.

Com 17-166 A slight extension of as proposed by City staff was not discussed in the DEIR, leading to an incomplete project description.

Com 17-167 Consider day-lighting a portion of this channel, fenced if necessary, through the park to accommodate riparian trees without compromising capacity.

Com 17-168 The bypass should not accept water until flows in the main channel reach 1000 cfs. This will help focus most flows into the "natural" channel. Most of the time, there would not be a high velocity coming out of the bypass, so there may be less of an erosion problem by bypassing less flows (e.g., allowing first 1,000 cfs to stay in creek). More water would be available to recharge the natural habitat in the area of the oxbow, if there is any proposed. Also, since steelhead migrate in flows between several dozen and several thousand cfs, placing flows above 150 cfs into the concrete channel, which steelhead cannot use, would in essence be

17-107 Maintenance procedures have been revised since the DEIS/EIR. Please refer to Appendix H of the EIS/EIR.

17-108 Maintenance procedures have been revised since the DEIS/EIR. Please refer to Appendix H of the EIS/EIR.

17-109 See response to comment 17-32.

17-110 No data about existing bio-filtration properties of Lower Mission Creek have been adduced. Mosaic pattern of managing plants in the stream bed, perpetuation of a pilot channel, and ledges placed on walls to encourage permanent scour pools would facilitate as much bio-remediation of aquatic contaminants as may take place under current conditions.

17-111 See response to comment 17-32.

17-112 While a meritorious suggestion, the flood control project was not authorized to remove that length of trapezoidal channel.

17-113 Four large eucalyptus would be removed.

17-114 Section 10 of the EIS/EIR speaks to incidental impacts to steelhead. Please refer to the Biological Opinion from National Marine Fisheries Service, Appendix A

17-115 Comment noted. Other biologists have different opinions about ancestry of trout extant in upper reaches of Mission Creek.

17-116 Nowhere did the DEIS/EIR entertain annual de-silting of 20,000 yd^3 within the project area. Use of glyphosphate herbicides would be kept to an absolute minimum.

17-117 A shade study has been completed for the project. A discussion of the shade study and its results is now included in the Biological Resources Section.

reducing the time available with suitable flows for migration in the natural channel. Therefore, the first 1000 cfs should flows in the open channel.

Com 17-169 — Piecemealing
By not including the local enhancements to the project and by not disclosing and considering the RDA's $2.5 million, the project is chopped up into smaller segments. The main project does not include many of the project features that mitigate impacts, and thus, the DEIR is flawed for not disclosing these project components. Had it done so, more alternatives would have been considered feasible because the money could have incidental benefits of mitigating project impacts, as needed, and thus a larger suite of project options and mitigation measures would have been available within the b:c ratio limits..

Com 17-170 — Biological Mitigation Measures
Measure 1: The exclusion should extend through mid April, due to the potential for steelhead to still be moving downstream in rainy years. Delete the phrase, "whenever significant flows pass down Mission Creek." This is vague. The idea is to keep machinery out of the creek during steelhead season. While, as noted, steelhead can occur in the creek year round, they are only likely to move in mid December through April, unless large storms hit sooner than mid-December causing high flows that would facilitate an ocean run. Thus, there should be no heavy equipment in the channel during this time, unless flows are nonexistent or virtually so.

Com 17-171 — There should be no desilting or dredging of the estuary, ever. Therefore, it is important that Dr. Ann Riley's concern (attached) and Flood Control employees' concerns that the widening will induce sedimentation in the area with a low gradient, below Highway 101 to the ocean. What would the impacts of having to dredge the estuary be? Will this project potentially increase maintenance needs in this area?

Com 17-172 — Native Plants on Rip-Rap
These measures should specify with clarity the need to use plants from local genetic pools, rather than introducing non-local "native" plants and their genes to this area, weakening their long-term ability to survive local conditions.

Com 17-173 — Utilize streambed vegetation in bank revegetation.

Com 17-174 — Other Mitigation Measures
Avoid large sycamores by using pilings, realigning channel as needed.

Com 17-175 — Use tarmacs or other pads for heavy equipment work in creek during maintenance to reduce impacts to biology.

Com 17-176 — Concurrent consideration of the use of the $2.5 million (which will be available during construction) in ways that complies with RDA rules and that facilitates the necessary mitigation presented in this letter. Uses could include purchase of properties to lessen use of walls, upstream concrete removal, structure relocation and tree planting. Please include a

17-118 No maintenance would ne necessary in the estuary at any time. Please refer to the Biological Opinion from National Marine Fisheries Service, Appendix A

17-119 No change of water depth, flow characteristics, or water temperature would occur in the estuary. The project would not alter physical conditions in the estuary. No indirect impacts to steelhead would occur as a result.

17-120 This statement has been corrected in the EIS/EIR.

17-121 Comment acknowledged. However, it should be noted that a temperature study recently completed for lower Mission Creek concludes that temperatures outside of high flow periods, even in shaded areas, are generally too high to allow for steelhead survival.

17-122 Comment acknowledged.

17-123 The National Marine Fisheries Service (NMFS) has completed a Biological Opinion (BO) on this project related to the Tidewater goby. NMFS has concluded that the project results in No Jeopardy to the Tidewater goby. Conditions related to project construction have been included in the BO and have been incorporated into the biological mitigation measures.

17-124 See response to comment 17-123.

17-125 See response to comment 17-123.

thorough analysis of how the incidental benefits of the RDA funds to this project's mitigation make feasible additional necessary mitigation without impacting the b:c ratio.

Other recommended mitigation measures are presented throughout the text of this letter. These are suggested to mitigate the identified significant impact s to the maximum extent feasible.

Com 17-177 Residual Biological Impacts
Due to the flawed use of the HEP, its assumptions and failure to include impacts, including the repeated clearing of maintenance, thermal pollution, cumulative impacts, and impacts on pool depth, the reduction in numbers of gobies, the significant conflicts with LCP and General Plan policies, the loss of biomass and mature, ancient trees of genetic importance, the extensive use of vertical walls covering at least a ¼ acre of creek bed and bank, impacts to steelhead overlooked in the BA, the questionable nature of the habitat expansion zones, the significant temporal impacts, and other factors not fully explored in the DEIR/EIS, the residual impacts to biological resources are significant. Moreover, there are numerous significant specific biological impacts discussed in EDC's letter, and the EIR cannot mask these by blending them with purported beneficial impacts. Based on the following issues identified and discussed by EDC, and supported by attachments to EDC's letter, the ratio of pre-project HEP with post-project HEP (even after 30 years) is more than one to one. This mean that even over the long term, the habitat values will be lessened, not improved by 3% (.04 Habitat Unit) as stated in the DEIR/EIS and HEP.

Com 17-178 The EDC is disappointed that after all the discussion of how the project will improve Mission Creek, the Corps own HEP, which we believes underestimates impacts, finds that there will be only a 3% improvement in habitat over 30 years (excluding the speculative wetland construction). EDC expected this project would significantly improve the habitat values, as we had been told, and that our comments would thus need to be less extensive.

Com 17-179 **Land Use**
Section 11.5 states that impacts to land use would be considered significant if the project would result in substantial loss of open space or impacts to biological resources or aesthetic qualities would occur. As noted above, significant impacts to several specific biological resources exist, so Land Use impacts are also significant.

Com 17-180 Furthermore, since the project will reduce the buffer between most existing buildings and the creek, in many cases significantly reducing the buffer by less than half, this is significant loss of buffer along 1.2 miles of creek. Many more buildings will now be very close to the creek, posing environmental impacts (night lighting, non-point source pollution, noise, human activities, pets) more significant than before because the many buildings will be closer to the creek. This is a significant land use impact, and it makes more properties non-conforming with the City's 25-foot setback. Homes are not a consistent use near creeks, and this project puts more buildings nearer to the creek.

17-126 The Mandatory Findings of Significance (CEQA Guidelines Section 15065) are used to determine whether or not an Environmental Impact Report (EIR) will be prepared. These findings do not require that the EIR find that the impact on a threatened or endangered species is significant, only that the potential for significant impacts exists. The EIR includes analysis of the potential impacts and reaches conclusions on the significance of the impacts. The impact may or may not be significant, as determined by expert analysis. See also response to comment 17-5.

17-127 *C. marmorata* has not yet found its way into existing pools within the project area, which disappear periodically with current maintenance practices. Habitat preferences for a species of concern not present in the project area cannot be evaluated.

17-128 Large rocks placed as fish baffles along the sides of the creek would enable most terrestrial quadrupeds to come and go from the stream bed. Those which can climb surfaces would not be hampered at all.

17-129 The preferred design would install a total of approximately 7250 linear feet of walls. Toe walls would amount to approximately 4740 linear feet, and full-height vertical walls would be approximately 2510 linear feet in length.

17-130 See response to comment 17-103.

17-131 See response to comment 17-103.

17-132 Whereever feasible, impacts to significant trees are being avoided by applying the suggested method and other feasible methods.

Com 17-181 The DEIR stated that the consistency with the biological policies could not yet be determined because of the unknown project details. This conflicts with page 11-9 which finds the project "consistent with the goals and policies and programs of the" General Plan. EDC finds the project, as vaguely described, inconsistent with many provisions of the General Plan, LCP and Coastal Act, and this is a significant Land Use Impact.

Com 17-182 Notably, the Conservation Element and LCP/Coastal Act all call for protection of natural resources over other uses, and favor their respective more protective policies in cases where the policies conflict internally. However, the project (even as further modified but not modified in the DEIR) extends protection to homes and other structures over the creek, including a commercial building, in violation of requirement that the more protective policy controls when conflict amongst policies arise. Violation of this requirement is violation of the LCP and General Plan, and is thus a Land Use impact of a significant nature.

Com 17-183 The Finding on page 11-10 that the existing land uses would change from residential / commercial to natural creek bed or open space," is somewhat inaccurate and misleading. The creek bed would be maintained free of vegetation, and will be anything but natural, pending changes to the maintenance plan. Furthermore, there is a substantial loss of buffer. This is a loss, not a gain, under Land Uses.

Com 17-184 Section 11.8 Coastal Zone Management Act Consistency
The proposed project, Alternative 12 is not consistent with the Coastal Act or LCP. These inconsistencies constitute significant Land Use impacts. The project is not the least environmentally damaging alternative, as discussed, and impacts could be further mitigated. Channelization in the estuary and creek violates the LCP and General Plan, respectively

Com 17-185 Residual Land Use Impacts
The Land Use Impacts identified are significant and cannot be mitigated unless the biological impacts are reduced to less than significant and all policy inconsistencies are corrected.

Com 17-186 **Socio-Economic Impacts**
These are potentially significant if there is a conflict with local policies. As noted, there are policy conflicts. Thus, the socio-economic impacts may be significant. Page 12-12 states that, "Impacts to socioeconomics are significant and adverse, but these buildings are subject to flooding and would be damaged by future flooding." Just because these buildings are subject to flooding does not erase the significant impact because the buildings are have been used for many years, including times of flooding, and they have remained in use despite the flooding.

Com 17-187 **Aesthetic and Visual Resources**
The significance criteria on page 13-5 include visibility and number of viewers. The giant trees along the creek stand out, are prominent, and viewed by many. Thus, these significance criteria are met. The project would dominate the view for fewer people than see the trees. The setting, though, is a creek, and a 2.4-mile long series of walls is proposed. We appreciate

17-133 The EIS/EIR has been revised to clearly state which trees would be removed and which would be saved.

17-134 The project description has been revised to save the sycamore tree immediately downstream from the Mason Street Bridge.

17-135 There is no separate threshold for loss of biomass. However, loss of biomass is one of the factors considered when determining if there is a significant adverse effect on a sensitive habitat.

There is only one oak tree within the project reach that would be affected. It is a relatively small tree immediately upstream of the Ortega Street Bridge. Unfortunately, it cannot be saved. However, the project has been redefined to save as many of the sycamore and other native trees as possible. In addition, several non-native trees would be preserved. Biomass was not considered. A great many other equally relevant parameters also were not considered, e.g. net rates of primary production, turnover rate of phosphorus, frequency of genetic migrants of sycamores, etc. It is not possible, nor ultimately informative, to evaluate all credible parameters in coming to a conclusion.

17-136 The loss of concrete sills and erosion control structures will be mitigated by the construction of fish ledges, Tidewater goby refugia, energy dissipators and boulder fields. Pools will be maintained in areas where there are fish ledges. With the inclusion of these features, differential erosion and sedimentation patterns should continue.

17-137 See revised Project Description of the Operation and Maintenance Plan.

the City's intention to include treatment. EDC strongly supports the planting of native vines on this wall's top.

Com 17-188 Removal of 120-year old trees is a significant impact. The DEIR identifies that most of the 18 mature trees onsite will be removed, including the sycamores, oak, willows, and cottonwood. These stately sycamore trees are a significant visual resources, they are remarkable looking, and people always look at and admire the beauty the old sycamores. There mottled white bark, intermingled branches and large green leaves are aesthetically pleasing, and during the falls, these big sycamores are a sight to behold. The loss of this, as well as there sheer size and biomass, is a significant impact that must be reduced to the maximum extent possible or feasible.

Com 17-189 Deletion of the planting culverts may improve aesthetics, as well as deleting a potentially unnecessary cost.

Com 17-190 Public concerns are not addressed by this project (page 13-7). If the habitat quality is only increased by 3% according to the flawed HEP (and is actually reduced according to EDC's biologist) then how can visual quality be increased? The naturalness is key to the project, and while making the walls appear as stone is good, it does not mask the fact that there will be 2.4 miles of new vertical walls of about three to ten feet tall. Furthermore, while the HEP concludes (erroneously) that habitat value can be increased with Alternative 12, this is based on a snapshot taken 30 years after project construction and planting: the year 3034. Assuming visual resources parallel biological resources because the main role vegetation plays in both, visual resources would not return to project conditions until after 30 years. This impact analysis fails to consider temporal visual impacts, which are significant.

Com 17-191 The impact analysis also relies on the constructed wetland, which cannot be considered because the DEIR/EIS finds it is very speculative; it would represent the best case scenario at this point. It may also be possible that the habitat expansion zones may be unavailable, as noted in the document. Without the wetland, and potentially without the habitat zones (page E-3), aesthetics are reduced further.

Com 17-192 The project, as previously noted, violates visual policies in the LCP and General Plan. These policy conflicts help establish the finding of significant visual and land use impacts. Simply because some project aspects may seem to improve the visual qualities of the creek, others degrade it substantially. These good and bad impacts cannot be blended to make it seem like there are no significant visual impacts; the adverse significant impacts stand alone. EDC concludes that widening the creek, increased creek bed maintenance, fencing, walls, and a narrower buffer area between the creek and buildings are all significant adverse impacts. While the DEIR may find long term visual improvement, which EDC disputes, this does not eliminate the shorter-term significant impacts of construction, and the long-term significant impacts of repeated bed desilting and vegetation removal.

Com 17-193 The DEIR finds significant impacts associated with channel construction, stockpiling, bridge replacement, and fencing (page 13-9). This impact must be mitigated, but no mitigation is

17-138 See response to comment 17-136.

17-139 Based on a preliminary riprap analysis, the riprap size on the channel bed would need to be 15 maximum. The riprap was sized for the design discharge of 3400 cfs. It would be expected that the locals would provide O&M.

17-140 See responses to comments 17-136 and 17-137.

17-141 Please refer to response to 17-27.

17-142 Please refer to response to 17-27.

17-143 See response to comment 17-78, Item 11.

17-144 Depth of the estuary is dependent on the tidal influence. The depth of the estuary for existing conditions can be as much as five feet. This amount would not change with the project.

proposed. The DEIR/EIS cannot find that visual impacts are not significant since it identifies significant visual impacts (fencing, bridge replacement, channel construction, and stockpiling). Also, the DEIR finds that loss of existing large trees and vegetation would be a significant impact. No mitigation measures are discussed for the trees or stockpiles.

Com 17-194 Maintenance
The DEIR states that maintenance will be similar to past practices. However, the DEIR refers to significant increases in maintenance (2400 cy removed per year, and another 20,000 cy redistributed in the channel – in pool areas). The project includes more frequent vegetation removal in the bed, so the pretty green herbaceous plants, including slender, graceful cattails and tules, bulrushes and sedges, will be eradicated. The DEIR is wrong not to find increased visual impacts of maintenance. Maintenance is increased, and so are its impacts. The area to be maintained will be essentially doubled, and maintenance will be more intense and frequent based on the DEIR, increasing further the significant visual impacts of the project.

Com 17-195 Program EIR Identified Significant Visual Resources From Flood Control Maintenance
The 1991 Program EIR for flood control maintenance (impact summary attached) in Santa Barbara identified a significant visual impact from flood control maintenance in south coast streams. Thus, by increasing the maintenance over current practices, this project increases already significant unavoidable impacts identified in the earlier EIR.

Com 17-196 Visual Impact Mitigation and Residual Impacts
The proposed mitigation measures do not address the stockpiles, construction impacts, and maintenance impacts. Therefore significant residual impacts remain.

Com 17-197 Recreation
Page 4-12 of the DEIR/EIS states that, where feasible, fencing should be ... replaced with native plantings that would keep people out... ." The project's insistence that access be prevented is a significant recreational impact. Furthermore, since the project violates coastal recreation policies, as discussed previously, this supports a finding of a significant land use and recreational impacts. The entire recreation section, however, fails to mention the fencing or the exclusion of people from the creek they have been able to walk for years. Stopping all recreational access to the creek is a significant impact to recreation.

Com 17-198 HTRW
How frequently would soils excavated be tested to determine if they need special disposal? Could contaminated fill be placed back behind the walls or under the slopes?

Com 17-199 Safety
How would the reduced setback and provision of vertical walls increase the chances for people falling into the creek, either during high flows or dry times?

Com 17-200 Currently, there are a lot of things for people to grab onto if they were to be captured in a high flow in the creek. The banks are close to each other, increasing someone's chances of grabbing a pipe, root or branch. However, with low and tall vertical walls the entire project

17-145 The Biological Resources Section has been revised. Also, see response to comment 17-9.

17-146 See response to comment 17-27.

17-147 The cylinders would be required initially to prevent young trees from being damaged by the riprap as it shifts. Once the trees reach sufficient size, the cylinders would be designed to break apart so that they would no longer be required.

17-148 Based on a preliminary riprap analysis, the riprap size on the banks would need to be 15" maximum. However, future design changes requested by the local sponsor may require larger and thicker riprap.

17-149 The author makes a good point. Willows would be planted as described, in addition to being placed as wattles below the riprap and aggregate filter layer. Please refer to Appendix H for details of maintenance.

17-150 The author makes a valid suggestion. A material like a jute mesh would be used on the finished slopes.

17-151 The author makes a valid suggestion. It will be included in plans and specifications.

17-152 See response to comment 12-5.

17-153 In addition to the sycamores, there will be willows and understory shrubs planted on riprap slopes. They can be planted randomly to create a more natural appearance. Additional sycamores will be planted by the City of Santa Barbara.

17-154 See response to comment 17-153.

length, and vertical walls from 101 to the ocean, would the chances of someone not being able to grab hold of something increase? Does the widening make it more difficult for someone getting swept out to sea to grab hold of something on the bank?

Mitigation and Residual Impacts

Com 17-201 Why, under mitigation measures, does the DEIR require the installation of bars at the end of the tunnel to restrict passage to people for Alternative 8 only? Should this measure not also apply to Alternative 12 since it also has the oxbow bypass? Without this measure applied to Alternative 12, this significant safety impact remains.

Cultural Resources

Com 17-202 The list of things that may qualify as historical landmarks excludes Mission Creek, however Mission Creek itself and the historic sycamore trees along it (those over 200 years old) are eligible for this status. This means that the existing creek should be maintained as much as possible so that the qualities that make it historic are not lost. This project will transform the creek into a modern channel with2.4 miles of vertical walls, and eliminate most if not all of the historic sycamores. This is a significant cultural impact.

Com 17-203 The discussion of cultural resource policies on page 18-22 of the DEIR/EIS fails to mention that the LCP and Conservation Element require that, where policies conflict, the one that is most protective of natural resources controls. Thus, policies that protect the creek, where they conflict with policies for protecting cultural resources, prevail. In this case, there are such conflicts, but the City has elected to extend vertical walls to protect buildings at the expense of the creek and natural resources. There is thus a conflict between the project and policy. Conflicts with locally adopted plans and policies is a land use impact under CEQA (CEQA Guidelines Appendix G).

Residual Impacts

Com 17-204 The significant impacts found on page 18-32 are the result of impacts to 9 structures. This figure may have changed as the project continues to shift in shape. The impacts are not mitigated, although it is misleading because the last line of the chapter states, ... are sufficient to reduce impacts to less than significant."

Utilities

Com 17-205 Under utilities, the DEIR should include a commitment to replace old sewer vitrified clay lines near the creek in the right of way. This should be done before construction inadvertently breaks them by shifting the soil. Temporary sewer lines could be installed during construction, if need be.

Cumulative Impacts

Com 17-206 The Cumulative Impact analysis is also inadequate from a CEQA standpoint. It leaves out mention and cumulative impact analysis of related projects. For instance, the approved project at 410 W. Isle Street includes installation of a new vertical wall in Mission Creek. However, the cumulative impacts of this and other bank hardening projects, including 609

17-155 The design constraint of the openings in the footing of the wall would not allow planting of trees so close the wall

17-156 The project description has been revised to indicate that all plants will be from native, local seed or cutting stocks. We agree that the City should start some seedling, especially of trees, early to encourage some larger trees in the project area.

17-157 Yes. Riprap slopes would be finished and planted concurrently. Habitat expansion zones might be scheduled for winter months when construction cannot occur in the creek.

Wax myrtle is a respectable member of the native coastal flora. Indeed, in some places it grows among dunes habitat and so would probably do well in places along Mission Creek nearer to the estuary.

17-158 Trees have to go over the openings in footers of the walls. That constraint limits the number. Trees in habitat expansion zones would be planted to a spacing of about 100 ft^2 per tree. Success criteria have been restated: 90% healthy and vigorous trees after 5 years.

17-159 The intent of trees and shrubs on the riprap slopes is to put natives back in the setting to which they are (presumably) well adapted. Creation of a bona fide riparian community is not the intent. In truth, that desirable objective cannot be achieved because of the physical separation of trees and understory from the creek proper by toe walls. The preferred design will not restore riparian ecological processes. On the other hand, it should have the overt growth form of gallery canopy and understory layers.

17-160 The trees will not be trimmed for aesthetics. However, they may be trimmed for safety purposes and access along public sidewalks.

Junipero Street, were not mentioned, assessed analyzed or mitigated in this section of the DEIR.

Com 17-207 Also conspicuously missing were any City projects or County projects. The City's proposal to breach the Mission Creek mouth will have cumulative impacts to the depth and water quality of the estuary combined with this project. This project is known and foreseeable; the City is seeking permits for it.

Com 17-208 The City, last year, cleared wetlands near Mission Creek. They are now proposing to restore the wetlands. The cumulative impacts of this clearing and restoration should be included for information.

Com 17-209 The County Flood Control District has an ongoing maintenance program that impacts each urban creek. Mission Creek has been maintained once in the past three years, based on a lack of need the other years. Other area creeks are impacted. The Mission Creek project would increase maintenance, and would thus have cumulative impacts with the regular program of maintaining other creeks.

Com 17-210 Also absent was a discussion of the specific cumulative impacts of Harbor View Expansion Project, La Entrada, and this project. The two projects were approved last year by the City. Each encroaches toward the creek. Harbor View encroaches on both sides. They reduce the setback such that when the estuary is widened to 60 feet, the Harbor View and La Entrada parking areas will be at the top of the bank.

This is a significant cumulative land use impact.

Com 17-211 By failing to consider the cumulative impacts of all three projects when they went independently through review processes, the City ended up giving the creek no buffer. This is a significant cumulative impact, and the flood control project's widening contributes significantly and considerably to this cumulative impact. Related resultant impacts also include water quality degradation, biological resource degradation, and visual degradation from the lack of a buffer. To mitigate these, the City needs to establish a buffer between the already approved projects and the creek bank. This can be done by buying land from the developers, or by narrowing the estuary channel. Incidental benefits from the use of the RDA funds may help the project fund needed enhancements, as it is intended for.

Com 17-212 The lack of a buffer that this project, in combination with recently approved projects (approved with the knowledge that the creek would be widened towards them) creates, raises significant LCP and Coastal Act issues (PRC Section 30240(b)). By failing to maintain an adequate buffer to protect the ESHA of the estuary, the project violates the Coastal Act and LCP.

Com 17-213 Other cumulative impacts include traffic and historic impacts related to La Entrada, which will likely be built at about the same time.

17-161 Due to economic and real estate constraints the lowest reach would predominantly use full-height vertical walls.

17-162 Toe walls and riprap slopes will finish 4740 linear feet of the creek, about 65% of the actual length of construction.

17-163 Where applicable, pile walls would be used to avoid all impacts to existing mature trees.

17-164 Based on concerns raised by NMFS, a weir has been added at the upper end of the oxbow bypass to route low flows (640 cfs or less) through the existing oxbow. IF flows are greater than 640 cfs, it is unlikely that steelhead will be moving upstream. Therefore, use of the culvert by steelhead should be minimized.

17-165 NMFS has accepted the proposed culvert length (to the Chapala Street Bridge) with the modification outlined in response to comment 17-164.

17-166 The short extension of the oxbow bypass requested by the City was developed in response to the cultural resources impacts from the loss of the Chapala Street Bridge and the Potter Hotel Footbridge. Therefore, it could not have been included in the Draft EIS/EIR.

17-167 In order to retain capacity and include riparian trees in the channel through the park, it would be necessary to make the culvert wider. Because the existing oxbow will be maintained as the low flow channel, it is not necessary to daylight the culvert.

ADDITIONAL DESIGN ELEMENTS RECOMMENDED

Com 17-214 Move channel to the east downstream of Mason to preserve the sycamore. Cut into Entrada project parking area, if needed.

Com 17-215 Everywhere a building is removed – restore habitat.

Com 17-216 Include overhangs and/or lunkers in the vertical walls at locations where pools might be expected to form.

Com 17-217 Vary slope angle to avoid uniform appearance.

Com 17-218 Treat the walls with a high relief texture that looks natural, not blocky. If possible, treat the wall in places to look more natural than a stone wall. Include shallow pockets for habitat value in wall.

Com 17-219 Narrow the channel bed at all habitat expansion zones, but offset the reduction in capacity by creating wide terraces or flood plains. Allow natural riparian processes to occur in these terraces.

Com 17-220 Ensure use of locally collected plant materials.

Com 17-221 Consult with experts to determine if the estuary depth will be decreased and design to avoid geo-morphological and biological impacts to estuary and listed fish.

Com 17-222 Extend sloping banks down, lower vertical walls, and accept a lesser Q. See alternatives section of letter.

Com 17-223 Conduct additional restoration / mitigation in channel upstream from Carrillo.

Com 17-224 Add lunkers as caves in channel bank, submerged, as decried by staff and Dr. Riley. Create more overhanging banks in the concrete wall, and add more instream habitat structures near the upper end of the project reach.

Com 17-225 Add structural diversity to the bed and banks to foster habitat diversity, and pools formation.

Com 17-226 Day-light the proposed channel near the Fig Tree, through the grass area, to promote riparian habitat. Two hundred linear feet of creek could be opened up here. How could this be incorporated into the project?

Com 17-227 If day-lighting the culvert is not pursued, revegetation the culvert right of way with native vegetation appropriate to the area, as a natural area in that park.

Com 17-228 Add use of cribwalls as appropriate, as recommended by Dr. Ann Riley. This would increase strength, aesthetics and biological resources. Please respond.

17-168 The main purpose of the culverts is to convey additional discharge that is beyond the capacity of the oxbow. There are numerous constraints on the design, including the clearance required under the railroad tracks. Because of this low clearance and due to backwater, there may be some flows in the culverts even during flows lower than 1000 cfs.

17-169 The RDA funding has not yet been approved, although the RDA board has indicated that they are likely to include funding in one of the next two bond cycles. It is not entirely clear for what the funding would be used. However, early indications are that funds would be used to increase the amount of native vegetation planted on the creek banks and in the habitat expansion areas, expand the edges of habitat expansion areas to provide recreational opportunities, provide for interpretive signing in the habitat expansion areas and adjacent to bridges, improve the aesthetics of the bridges to be replaced and/or improve the appearance of vertical walls. These possibilities have not been completely developed. When they are developed and decisions have been made on where and how the funds would be spent, additional environmental review, if necessary, would be completed.

17-170 The Project Description has been revised to reflect this concern based on requirements by NMFS to minimize impacts on steelhead.

17-171 Initial analyses completed for the project indicate that there will be no need to remove sediments from the estuary. This will be confirmed during the Pre-construction Engineering and Design phase for the project.

17-172 See response to comment 17-156.

Com 17-229 Why are the channel retaining walls apparently over-engineered with a 15-foot footings designed for a five-foot high wall?

Com 17-230 **Increased Maintenance Impacts**
EDC has referred to the increased impacts of increased maintenance throughout the letter. To summarize, the County works in the creek fairly infrequently, conducting vegetation removal and desilting on an as needed basis. The DEIR/EIS proposes to increase this frequency to annual removal of all vegetation, and removal of silt likely every year. Flood Control removed silt once in the last three years, 350 cy. The DEIR refers to 2400 cy per year as what is expected. This is a huge increase in heavy equipment work right in the creek bed.

Com 17-231 Also, since the creek bed will be doubled in width and area, the area to maintain will be doubled, and impacts will be much greater than baseline conditions, contrary to what the DEIR states, that impacts from maintenance will be the same as current maintenance impacts.

Com 17-232 The HEP, flawed as it is, also supports the notion of increased impacts to the creek bed. It states that the creek bed habitat value will be reduced by .5 habitat units, from .8 to .3. This drastic reduction in aquatic habitat / bed value can be attributed to the fact that the Corps and City know the maintenance will be more frequent and severe. Thus, for the DEIR to state that maintenance impacts will be the same as in the past for biological, water quality, visual resources, geological resources and other impact areas, is wrong. It is also internally inconsistent for identifying the both claiming no maintenance impacts and providing hard numbers (2400 cy/ year) supporting the increased maintenance and impacts.

Com 17-233 The Program EIR for Flood Control's current maintenance program (impact summary attached) identifies numerous significant unavoidable impacts from maintenance. Since the maintenance activity is proposed to be significantly increased in Mission Creek, the impacts of maintenance will be even more significant, but the DEIR offers no mitigation, and does not even offer to incorporate the County's standard mitigation measures for flood control maintenance.

Com 17-234 The County has elected to clear vegetation in Mission Creek using heavy equipment to avoid contact with feces. Thus, the impacts in Mission Creek, unless the County commits to not using heavy equipment to clear the creek, will be more significant than just using loppers, weed whackers and herbicides. The DEIR/EIS, however, does not address this.

Com 17-235 Maintenance is part of this project. Impacts of maintenance are significant. Therefore, this document must outline mitigation measures (from the Program EIR, for example) that will be used to reduce the impacts of maintenance to less then significant or to the maximum extent feasible, as required.

Com 17-236 On page 10-11, the DEIR refers to a May 1999 site visit in which "considerable growth of herbaceous and also perennial stream-bottom plants was evident. Many plant species had become established after the last channel maintenance." This green, natural creek scene will

17-173 See response to comment 17-156.

17-174 Please refer to response 17-163.

17-175 Because it will be necessary to excavate below the present grade to put in footings or piers, this is not feasible.

17-176 See response to comment 17-3.

17-177 Please refer to questions 28 and 45 for responses to this repetitive objection.

17-178 See response to comment 17-177.

17-179 However, the impacts outlined in your comment will be mitigated. Therefore, there are no significant land use impacts related to these issues.

17-180 See response to comment 17-15.

17-181 See responses to comments 17-8, 17-10 through 17-43, 17-46, 17-78 (Item 8) and 17-84

17-182 See response to comment 17-181.

17-183 See response to comment 17-15.

17-184 See response to comment 17-181.

17-185 There may be some instances where policies conflict. In these cases, it may be necessary to balance these policies. Final decisions on policy consistency will be made by the Santa Barbara City Council and the Santa Barbara County Board of Supervisors.

be removed from the bed of the creek permanently, and over much of the banks' lengths, there will be no sloped vegetated bank to block the views of the barren, silty, unpleasing creek bottom.

Com 17-237 Flood Control's Environmental, permitting person was quoted in the EIR saying that the lower reaches of Mission Creek are cleared of vegetation every "few years." This reflects the less frequent maintenance currently on going. To increase this to annually will greatly increase impacts to aesthetics, biology and water quality, etc. Now, the herbaceous plants that had been able to establish between maintenance episodes will be cleared before they get big enough to offer biological, water filtration, or visual amenities of any significance. This is a significant, ongoing, repeated impact suite of maintenance as proposed.

Com 17-238 On page 10-43, the DEIR sums up EDC's position with regards to future creek maintenance. "Effectively, the stream channel would be stopped from undergoing normal successional changes of plant assemblages and it should retain the bare quality that will exist after construction has been completed, unlike the current maintenance pattern which fosters growth of plants to a larger size before cleaning the stream's channel. ... little growth ... would occur." Any statements in the document that maintenance levels, frequency and intensity will remain essentially unchanged, and that therefore impacts from maintenance remain unchanged, are false and in conflict with other statements in the DEIR/EIS. The significant impacts of the Lower Mission Creek Flood Control Project maintenance component must be mitigated to the maximum extent feasible, or to less than significant if possible.

Com 17-239 "A 60-foot wide project channel could represent a long-term maintenance liability in this lower section from Highway 101 to the beach," according to Dr. Riley. Widening the creek could well induce increased sedimentation (as indicated in the high desilting requirements in the DEIR/EIS). "A 60 foot wide channel may be too wide for efficient sediment transport." How will this increase sedimentation and maintenance impacts? Why was this not factored into the HEP, which did not include maintenance impacts because it assumed that the bed could be kept sterile and that maintenance would not increase (despite calling for 2400 cy of silt removal each year)?

Com 17-240 Vegetation clearing should never eliminate all vegetation at once. At least half should remain at all times. The County's maintenance plan for this project – which was inappropriately excluded from the DEIR even though the EIS makes a big point that maintenance is included in the project – includes a provision for leaving half the channel uncleared each year. Additional mitigation measures are needed to offset the significant maintenance impacts EDC has identified, and are identified in the County's 1991 Program EIR.

Com 17-241 These could also include replanting all areas on the banks where native vegetation becomes sparse, avoiding the use of herbicides by pulling plants up and using them in revegetation if practical. Willows can be planted under the rip-rap or can be plants into or on top of the rip-rap during wet conditions, or if watered.

17-186 The reference in Section 12.3 has been clarified to state that, if the project is inconsistent with the plans and policies discussed under the policies applicable to the resources area (in this case Housing Element policies), then there may be a potential for significant effects.

17-187 See responses to comments 17-18, the first part of 17-30, 17-43 and 17-46.

17-188 See responses to comments 17-46, 17-113 and 17-135. Also, see Section 13.3.2 for discussion of the individual stately trees.

17-189 In order to protect young trees while they mature from movement of riprap caused by high flows, it is necessary to include these planters.

17-190 See response to comment 17-18.

17-191 See responses to comments 17-98 and 17-102.

17-192 Section 13.3.2 has been revised to better clarify the short-term impacts.

17-193 Construction impacts, by their temporary nature, are not usually considered significant and mitigation is not required. In regard to fencing, see response to comment 17-16. The mitigation measure for fencing has been clarified.

17-194 See response to comment 17-137.

17-195 As determined in the revised maintenance plan, maintenance will not be increased over existing. Therefore, no significant visual impacts are expected to occur.

17-196 See response to comments 17-187 through 17-195.

Com 17-242

The DEIR must include the detailed maintenance plan or else its project description is incomplete (see attached draft maintenance plan). This maintenance plan was supposed to be created in a community format, but the Mission Creek Consensus Group Maintenance subcommittee set up to work on it never met, although the EDC had one meeting with County and City staff. Please establish a real community process to finish the maintenance plan, or ensure that it has adequate environmental safeguards unlike the Corps proposed unmitigated maintenance plan.

Com 17-243

Changing and Undefined Project Description
The City has consistently reported that the use of lunkers for aquatic, under bank habitat refuges, is a part of this project, but they are not referred to in the project (nor are any instream habitat structures except the two rock piles. This is a vague project description, does it include lunkers or not. Are the lunkers part of the local enhancements? Whether they are or are not local enhancements, if they are part of the project or contemplated as reported by the City and Corps of Engineers at public meetings during late 1999 and 2000, then they must be described in the report. Otherwise, there is no accountability to actually include important aquatic habitat features. The project is poorly defined for the purpose of impact assessment, and the project description is shifting.

Com 17-244

The City has consistently reported that, in conjunction with this project, it is pursuing a back-yard tree planting program, first proposed by EDC and other local groups, to extend the riparian tree dripline outward into private properties for the purposes of enhancing the creek's natural values. The City would help to grow saplings of native, locally obtained, genetically appropriate canopy trees for distribution or low cost sale to creek-side homeowners wishing to undertake this "backyard creek restoration."

Implementation of this thoughtful program is critically important to mitigating some of significant and other adverse impacts of the project, including the impacts of continued but increased maintenance will be substantially increased over the baseline. However, it needs to be described as part of the project or mitigation program in the DEIR/EIS, it is known and being considered by the City which has gone so far as to contact local non-profit groups that it can contract to grow the plants at a nursery. So this is reasonably foreseeable if it is another project. It really is part of this project hand has been described as a local enhancement on the flood control project. It thus must be described in the DEIR/EIS, and this will help the project to mitigate some of the significant environmental impacts of the project on biological resources.

Com 17-245

Similarly, the City has routinely stated that the 40 foot plant spacing proposed by the Corps is insufficient, a position echoed by many public commentors. City staff has also repeatedly stated that the locals would beef this up to increase the density of native canopy trees, but the DEIR says that the "final spacing" is forty feet based on design constraints. While EDC disputes these design constraints as described herein, this discrepancy must be cleared up. This project as described by the local co-sponsors in public meetings differs greatly from how it is described in the DEIR. This vagueness makes impact assessment impossible because there is no way to know if these added project elements described as part of or related

17-197 See responses to comments 17-16 and 17-19.

17-198 In reference to the comment inquiring as to how frequently soils could be excavated and tested and the appropriateness of placing contaminated soils behind channel walls or beneath slopes, the following response is offered.

The question of frequency of testing is confusing. If the soils are tested and they show no actionable levels of contamination why would they need further testing? If they are clean they are clean. If they are contaminated and concentrations are at actionable levels, they must be remediated or disposed of at an appropriate facility. In some cases it is acceptable to isolate certain types of contaminants from the elements instead of disposal at a land fill. Examples of this method are paving over a contaminated location, or placing a building over the location. Placement behind retaining walls or under the bank slopes would be unacceptable due to the geohydrological characteristics of the lower mission creek area. The shallow groundwater gradient runs into the creek. Ground water is generally high in this area. The channel can be expected to carry large volumes of water periodically. These factors combined create a situation whereby any contaminants located behind retaining walls or beneath the bank slopes are likely to migrate through the saturated soil matrix. This is an unacceptable occurrence in an area adjacent to a perennial stream.

17-199 The setback will not be reduced. There will be a net reduction in full-height vertical walls. In addition, fencing will be provided. Therefore, impacts from people falling in the creek should not increase.

elements to the project are really proposed. The DEIR does not say they are, the leading local agency staff people describe these elements when they describe the project to soften. Indeed As one of only a handful of biologists on the County's list of qualified biologists, I am amply qualified to determine on behalf of EDC that these measures are needed to mitigate significant impacts to the maximum extent feasible.

Com 17-246 There is also a fairly large discrepancy between the number of buildings and other structures to be removed as described in the DEIR/EIS and as described by staff at various public hearings and workshops. Which houses and structures are to be removed and which are not? The draft EIR is vague and inaccurate by not including this information. The project has changed and continues to change. More houses are proposed now to be left in place next to the creek with reduced buffers than as described in the DEIR. Impacts to biological resources are increased by this change. Also, policy inconsistency is increased because an emphasis has been placed on cultural and other building preservation over natural resources – in direct violation of the Conservation Element and LCP both of which state that where conflicts between policies exist, the one that is most protective of natural resources controls.

This undefined or now inaccurately defined and constantly evolving project must be specified for accurate impact assessments. In many cases, the issues described in this section are not clearly defined or are inaccurately defined or not included in the DEIR, rendering the project description legally inadequate for the purposes of environmental review. The public and decision makers cannot accurately determine the impacts and policy consistency issues of a project that is not well enough defined to allow assessment. The DEIR/EIS' failure to accurately define all project elements as currently proposed requires a release of a new draft with a complete, accurate, and up to date project description. This will enable the public to know what exactly is proposed so that our experts can comment on specific elements of the project.

Prior to release of the DEIR/EIS, the City proposed and showed diagrams of another project change not described in the DEIR/EIS. An extension of the bypass channel to help foster a better bridge design at Mason, perhaps, has been described as part of the project. This is not described in the document though, even though it is an important design element that effects both policy issues and environmental impacts, including width and coverage of the creek and buffer area. Without fully describing the project, the document's description is flawed.

Com 17-247 The use of fences is poorly defined, and this effects the level of visual impact and policy consistency. The DEIR states that the use of fences should be minimized, and suggests the use of brambles to keep people out, but the type of fencing – and whether or not fencing or plants would be used – has been left up in the air in the project description. While this may seem like a technical design detail, it does effect the level of visual impact and visual resource policy consistency, and thus must be described in the DEIR.

Com 17-248 The DEIR states how many of the trees will be removed, but not which ones. During public meetings, the City has discussed that design modifications were being considered to avoid some of the trees. In particular, the City has discussed modifications to protect the tree at

17-200 See response to comment 17-199. In addition, the low vertical walls will be between three and five feet in height, low enough for people to hoist themselves out of the creek or for people on the sides to be able to grab people in the creek.

17-201 There will be no bars installed at the end of the overflow culvert.

17-202 Natural features are not normally considered to qualify as cultural resources unless they also have cultural or religious significance. An example of such a landform would be Rainbow Bridge in Arizona, which is sacred to the Navajo Nation (or Diné). Even if Mission Creek qualified as a cultural resource on its face, it would still not qualify because it lacks historic integrity. It has been substantially modified over time and no longer exists in its historic state.

17-203 In regard to the Conservation Element, see response to comment 17-12. In regard to the Local Coastal Plan (or land use plan), Policy 1.2 states: "Where policies within the land use plan overlap, the policy which is most protective of resources, i.e. land, water, air, etc., shall take precedence" Policy 1.3 states: "Where there are conflicts between the policies set forth in the land use plan and those set forth in any other element of the City's existing General Plan or existing regulations, the policies of the land use plan take precedence". However, see response to comment 17-26, 17-33 and 17-40. When it is determined that it is not economically feasible to carry out a project that would provide more enhancement of the natural resource, then it is important to preserve the cultural resources.

Mason Street, a large heron roost, and other of the giant sycamores. The DEIR does not describe any efforts to avoid any of the significant sycamores. Without defining which significant trees (the DEIR does not state how many of the sycamores would be lost, so a worst case scenario assumes all of them would be) will be removed, the project is not well defined which hinders accurate impact assessment. The project must be better defined for environmental review and policy consistency analysis.

Com 17-249 Also, the width of the channel is changing, and has reported differently at different times. In the DEIR, Table 8 describes creek widths that are substantially different than that described in the text of the DEIR. In many cases, the number reported in the table is ten feet (about 20%) or so less then as described in the text. Is the reader supposed to believe the table or the text?

Com 17-250 The project is poorly and ambiguously defined; the document contains contradictory information about the basic project design that effects both policy consistency and impact levels.

The project description must be stabilized and complete for public review in a new draft document.

Effective Discharge and Bankfull Channel

Com 17-251 The City hired Dr. Ann Riley to consult regarding the design and maintenance of the Lower Mission Creek project. In her letter (attached) she states that "given the importance of this bankfull channel to sediment transport, fisheries migration and habitat, channel stability, aesthetics and maintenance needs, a flood damage reduction project needs to address [the bankfull channel and effective discharge concepts] as a central design issue." Adaptation of the project to incorporate a bankfull channel design will thus have potential reductions in impacts to a wide range of environmental issues.

Com 17-252 How has the City addressed these comments as a central design issue, and changed the project to incorporate a bankfull channel in the design as recommended by its expert? Why does the DEIR not address this central design issue? The bankfull channel design should be described in the DEIR so the public knows what project it is commenting on.

Com 17-253 Dr. Riley reminds the City that the last Corps design was dropped because of sediment transport and deposition problems that would have cause the proposed channel to flood. Thus, sediment transport needs to be addressed. How will the channel be designed to transport silt effectively (i.e., how will a bankfull – sized channel be fit into the project)? This would likely be a channel within the two vertical walls, less in width than the entire bed width. Will a bankfull channel be maintained, after desilting operations, in the bed area? How will this be sized? What is the capacity of an appropriately sized bankfull channel in this reach of the Creek?

Com 17-254 The Corps has embraced the concept of bankfull channel and effective discharge. This must be addressed in detail in the DEIR/EIS to address the expert information provided by Dr. Riley to mitigate sediment transport problems that can effect project design capacity and

17-204 It is inappropriate to take a portion of the final sentence in Section 18.4 out of context. As Alternative 12 was originally developed, impacts to seven structures and two neighborhoods would have been significant and unavoidable. The impacts to the remaining historic structures at 134 Chapala Street and 434 De la Vina Street and to the archaeological sites would be significant, but would be mitigated as outlined in Section 18.3.4.2. However, it should be noted that, based on City and County recommendations to reduce costs, the project description would be modified to preserve six of the seven structures in place. The seventh structure, 15 West Mason Street, would be demolished, resulting in a significant unavoidable impact. In addition, because the structures in the West Downtown and Waterfront Neighborhoods would be preserved, there would be no significant impact to these neighborhoods. Additional language has been added to Section 18.4 to recognize this change to the project.

17-205 Utility lines that would be affected during replacement of bridges would be replaced.

17-206 Neither of the projects at 410 West Islay Street or 609 Junipero Street are within the project area. In addition, they do not have any substantial effects on flow, especially by the time flow reaches the project area. On that basis, they were not included in the cumulative analysis. See Response to Comment 17-30 for information related to La Entrada and the Harbor View Inn. It should be noted that both of these projects were included in Table 20.1-1, List of Reasonably Foreseeable Future Projects, in Section 20 Cumulative Impacts.

17-207 The project description for possible sand bar breaching, as part of a larger plan for beach management, has not been defined at this time. No sand bar breaching is taking

Com 17-254 cont

environmental resources. This is a central issue, but is not addressed in the DEIR/EIS. The DEIR/EIS states that sediment transport will be essentially unchanged, but widening the creek may cause sedimentation. Furthermore, the DEIR contradicts itself by also stating that desilting will be on the order of 2400 cy removed per year, with much more being redistributed. This vastly exceeds the current maintenance levels established by recent maintenance plans.

Com 17-255

Dr. Riley also suggests that the City "should request that the SAM model be used to compute an effective discharge in which a flow duration curve id numerically integrated with the sediment transport rating curve." Did the City ask for this and what was the Corps response? How has this affected project design and the bankfull channel concept?

Com 17-256

If the bankfull channel discharges are in the 600 to 900 cfs range, then how does this compare to the channel below the low vertical walls in areas with some sloped banks, generally? Can a bankfull channel (600 – 900 cfs) be integrated into the channel bed, say for instance, after construction and desilting which impacts it? It is very important to maintain such a channel for habitat and stability, for sediment transport, and to prevent sediment accumulation problems or scour.

Com 17-257

How will the project incorporate this expert recommendation to reduce impacts to biology, maintenance frequency, and sediment transport problems (considering the DEIR calls for extensive desilting after project construction)?

Com 17-258

The Corps used a roughness factor of .045, which affords the locals the opportunity to rough up the channel with vegetation without losing the capacity. Did the Corps only model the rectangular cross section or did they include the triangle shaped cross sectional areas above each of the sloped banks too? If they did not model the triangle areas, then the capacity could be more than 3400 cfs, giving more room for ecological improvement.

Com 17-259

How did the Corps model sediment transport? Will there be a hydraulic jump at the ocean?

Com 17-260

Please respond to each distinct point in this letter in as much detail as possible and necessary to explain the response.

Conclusion

The proposed project, Alternative 12, is inconsistent with numerous LCP and General Plan policies and Coastal Act provisions. It results in previously unidentified significant impacts to water resources, geological resources, biological resources, visual resources, recreational resources, open space resources, and other resources as described above. Mitigation of significant impacts is not offered in many cases, and does not reduce significant impacts to the maximum extent feasible. The DEIR/EIS did not analyze a reasonable range of alternatives, and included only 3400 cfs capacity alternatives for consideration. It dismissed options that are feasible, or that could be made feasible through necessary consideration of the incidental benefits of the RDA funding, and it failed to consider practical options with lesser significant impacts. Alternatives with fewer significant impacts than Alternative 12 are

taking place any longer while the City develops a plan for permitting, which will include changes to how maintenance of the beach and creek mouth occurs. Therefore, it is speculative to include this project in the list of reasonably foreseeable future projects, based on both timing and description.

17-208 The El Estero Drain is not in the same watershed as Mission Creek so it was not included in the cumulative projects evaluated for this project. In any case, neither project would have any particular effect on the other.

17-209 The commentor has presented no evidence to support his statement that increased maintenance of Mission Creek would affect maintenance of other creeks in Santa Barbara County. This statement is speculative and no analysis is necessary.

17-210 See response to comment 17-30. Some of this discussion has been added to the Cumulative Impacts section.

17-211 See response to comment 17-210.

17-212 See responses to comments 17-15 and 17-84.

17-213 It is somewhat speculative to state when La Entrada and the flood control project would be built. Traffic impacts in the Waterfront Area are based on traffic on peak summer Sundays. Neither project would be doing construction on weekends, so there would be no significant traffic impact. The commentor has also indicated that there would be historic impacts that are not discussed in the EIS/EIR. We are unclear how those could occur.

feasible, or can be made feasible, and are consistent with project objectives. Thus, these options must be further evaluated and pursued.

Thank you in advance for your attention and careful consideration of and response to our suggestions and comments.

Sincerely,

Brian Trautwein
Environmental Analyst
Environmental Defense Center

Attachments:
1. List of Santa Barbara County Qualified Biologists
2. Impact Summary from 1991 Program EIR for Flood Control Maintenance
3. County Flood Control Annual Plans; Lists of Projects Undertaken
4. Riparian and Wetland Restoration Working Group Report
5. Studies of the Effects of Glyphosate on Salmonids
6. Letter from Robert Vadas, Jr., Biologist, regarding Tidewater Gobies and Steelhead
7. E-Mail from Kevin Lafferty regarding Tidewater Gobies in Estuaries
8. 1-28-00 Memo from Waterways Restoration Institute to City of Santa Barbara
9. Draft Maintenance Plan for Lower Mission Creek Flood Control Project

cc:

Santa Barbara County Board of Supervisors
Santa Barbara County Flood Control District
Santa Barbara County Planning and Development Department
Santa Barbara City Council
Santa Barbara City Engineer
California Coastal Commission
California Department of Fish and Game
California Regional Water Quality Control Board
US Fish and Wildlife Service
National Marine Fisheries Service
Congresswoman Lois Capps
Waterways Restoration Institute

17-214 The City and County have proposed a change which would protect the sycamore tree downstream from Mason Street. This change has been accepted by the Corps.

17-215 In many places where buildings are removed, habitat is restored as part of habitat expansion areas. In a few locations, this is not feasible.

17-216 Overhangs and/or lunkers in the vertical walls would be part of the design.

17-217 A maximum slope angle of 1.5 horizontal to 1 vertical was used to minimize real estate costs. Varying the slope angle would require additional real estate.

17-218 The final wall design will be subject to review by the Mission Creek design Review Subcommittee.

17-219 During the final design, the channel geometry will be optimized. Channel narrowing would be considered.

17-220 The Project Description and the Biological Resources Section have been revised to incorporate use of locally collected plant materials.

17-221 Estuary depth will not be decreased.

17-222 See responses to comments 17-3, 17-4, 17-6 and 17-7.

17-223 This area is outside the scope of the project. NMFS has indicated that mitigation within the project area is satisfactory. However, work in this area may be considered as an opportunity project as part of the City's Clean Water and Creek Restoration Program.

17-224 See responses to comments 17-56 and 136.

		17-225 See responses to comments 17-56 and 17-136. 17-226 See response to comment 17-167. 17-227 The park area will be revegetated to match the existing vegetation. 17-228 The suggested type of design would have lower structural integrity than the preferred design. Moreover, it would not support the types of vegetation which are inherent in the current design. If the local sponsors would like to use this design for its aesthetic value, its use would be considered during the final design phase of the project. 17-229 The walls were designed according to all applicable engineering criteria. 17-230 According to additional sediment analyses, future maintenance requirements would be very similar to existing maintenance requirements. When several low flow years occur sequentially, sediment removal might occur once every two to three years. 17-231 See responses to comments 17-25 and 17-78. 17-232 See responses to comments 17-17, 17-28 and 17-32. 17-233 See response to comment 17-78.
		17-234 This is an existing condition and will not change until there is less feces in the creek. Over time, as part of the Clean Water and Creek Restoration Program, feces may decrease. IF it does, the County Flood Control District will reduce the use of heavy equipment. 17-235 See response to comments 12-8, 12-10, 17-25

and 17-78.

17-236 Much of the existing creek is in like condition. This condition will be improved after the project is completed.

17-237 See revised Maintenance Plan in the Final EIS/EIR.

17-238 See revised Maintenance Plan in the Final EIS/EIR.

17-239 See response to comment 17-25.

17-240 The revised Maintenance Plan includes a mosaic approach to vegetation clearance.

17-241 Maintenance procedures included in Appendix H include these recommendations. Willows would be included in the original planting in precisely the manners described (DEIS/EIR, Final EIS/EIR).

17-242 The revised Maintenance Plan is included in the Final EIS/EIR. Final details may be worked out during Pre-construction Engineering and Design.

17-243 Items such as lunkers were proposed by the City of Santa Barbara after the release of the Draft EIS/EIR. In addition, changes in design to reduce cost and save historic structures have been made. They will either be added to the Project Description or as Mitigation Measures under the appropriate section of the EIS/EIR. It should be noted that the project description contained in an EIS or EIR is never final. In fact, part of the purpose of an EIS or EIR is to refine the project description through mitigations. Additional refinements to the project description often occur during final design.

17-244 See responses to comments 17-85 and 17-243.

17-245 See responses to comments 17-14, 17-169 and

17-243.

17-246 See response to comment 17-243.

17-247 See responses to comments 17-16 and 17-193.

17-248 See responses to comments 17-14, 17-22, 17-46, 17-113 and 17-135.

17-249 Table 8 is based on the bottom width of the stream. Other references are based on the top width of the stream, including sloped banks.

17-250 See response to comment 17-243.

17-251 To assist in determining future maintenance needs, detailed sediment routing will be completed during the Preconstruction Engineering and Design (PED) phase of the study. Bankfull, i.e. effective or dominant, discharge curves could be developed from frequency-discharge and sediment discharge rating curves. In addition, stage-discharge and velocity-discharge rating curves would be available from the hydraulic models developed.

The sediment routing process normally takes into account antecedent flows, which are often smaller than the design discharge, as well as the entire design hydrograph, not just the peak discharge.

We will be available to meet with the City, the District, and Ms. Riley prior to the start of the PED phase of the study to discuss the concerns.

Note, however, that lower Mission Creek is a channelized "designed" channel and regime equations may not be applicable. However, we will evaluate the concerns during the PED phase of the study.

17-252 See response to comment 17-251.

		17-253 See response to comment 17-251. 17-254 See response to comment 17-251. 17-255 See response to comment 17-251. 17-256 See response to comment 17-251. 17-257 See response to comment 17-251. 17-258 The Corps modeled the whole cross-section, including the triangular areas above the banks, to minimize the real estate required for conveyance. 17-259 The Corps used a sediment budget program to model sediment transport. Since the flow from Mission Creek would be subcritical near the ocean, there would be no hydraulic jump. 17-260 See the above responses to comments.

	January 17, 2000 Dear Jan, We would like to thank you for the interest and concern in the status of our home at 116 Chapala Street related to the Lower Mission Creek Flood Control Project. Seeing our property targeted for removal in nearly all of the alternative plans, including #12 which is favored by the Corps and the City Staff, of the main report and the EIS/EIR December 1999 was very alarming.	Responses to the comments from: Jerome and Gabrielle Boucher 116 Chapala Street Santa Barbara, Ca 93101 The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciates your comments vital to the success of this flood control project.	
Comm 18-1	We have received assurances from you and Pat Kelly that you are working on how to save some of the historic properties such as our's along the creek. We never felt that the old aerial maps of our property were accurate. Fortunately, you had Bruce Burnworth of Penfield and Smith Engineers, consultants for the City of Santa Barbara, re-measure. Jerry was present on January 4, 2000 when Bruce and his associate re-measured the width of the creek from the edge of our house, (creekside), to the other side of the creek extending to the edge of the Funke property, (New Orleans/Florida Keys style apartments), on Kimberly Avenue. Bruce told Jerry and announced later that evening at the neighborhood L.M C F.C. & C.E.P. that his new on-site accurate measurement, (see attached sketch), delivered more than enough leeway for the widening of Mission Creek to 60 feet including the preservation of our house and the old sea wall. His direct quote was, "your house is saved !"	18-1	As you are aware, based on the corrections to the City map used by the Corps in this study, the required clearance for the new creek between 116 Chapala Street and the building directly on the opposite bank is in fact available. Therefore, removal of the subject property would no longer be required.

We love being homeowners in Santa Barbara's historic waterfront district. We see hundreds of tourists a day walking up and down Chapala Street from Cabrillo Blvd. admiring our homes and the renovated train depot. If we're outside, they'll question us about our unusual historic home and newly landscaped garden. We really appreciate your efforts to preserve our old property.

Comm 18-2 Additionally, we think the artist's renderings of the creek are lovely, but we're wondering how many tourists are going to love walking along the banks of a cesspool. Unfortunately, Mission Creek is very polluted and when one sees this slimy and smelly contaminated body of water, especially at low tide, that is littered with everything from underwear to furniture, it does not take one a second to look away with disgust.

The wonderful native vegetation, sloped sides, natural bottom and boulders, could look wonderful, but if we can't control Mother Nature and the tides, why do we need to double the size of the creek to insure flood control ?

Comm 18-3 We heard a plan suggested by a very successful Santa Barbara businessman that we hope the Army Corps of Engineers and the City Engineers will seriously explore. It involves adding an additional plan to the mix of alternatives The suggestion to extend the box culvert from it's current outlet point near the Chapala Street Bridge to the end of Mission Creek, has great potential to make all interested parties in this project happy. Suggesting that a large canopy of trees cannot be planted on top of the culvert needs to be determined by horticultural experts, in addition to substituting other effective vegetation.

Comm 18-4 We will have a major objection to relocation/removal of our home if the purpose is to allow for the creation of another pocket park. We believe that the calculation process that the city went through to determine whose property is the most cost efficient to

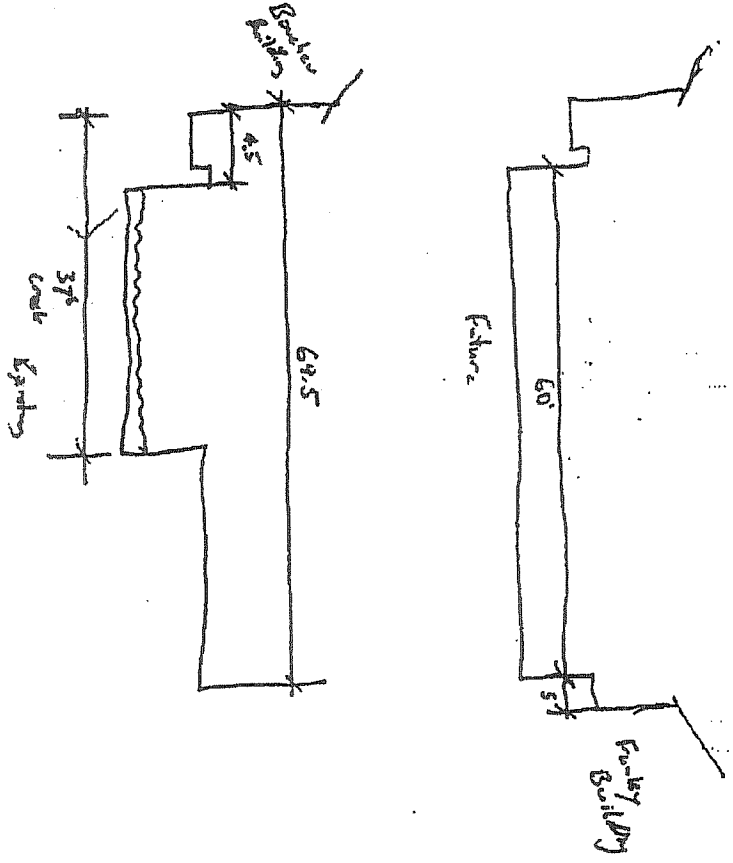
18-2 The maintenance of the creek for flood control purpose would be the County Flood Control's responsibility and they would occasionally remove debris along this reach during their maintenance activities. The City would have to expand their current program to eliminate this problem. See response to comment 12-16 for more discussion of proposals to improve water quality.

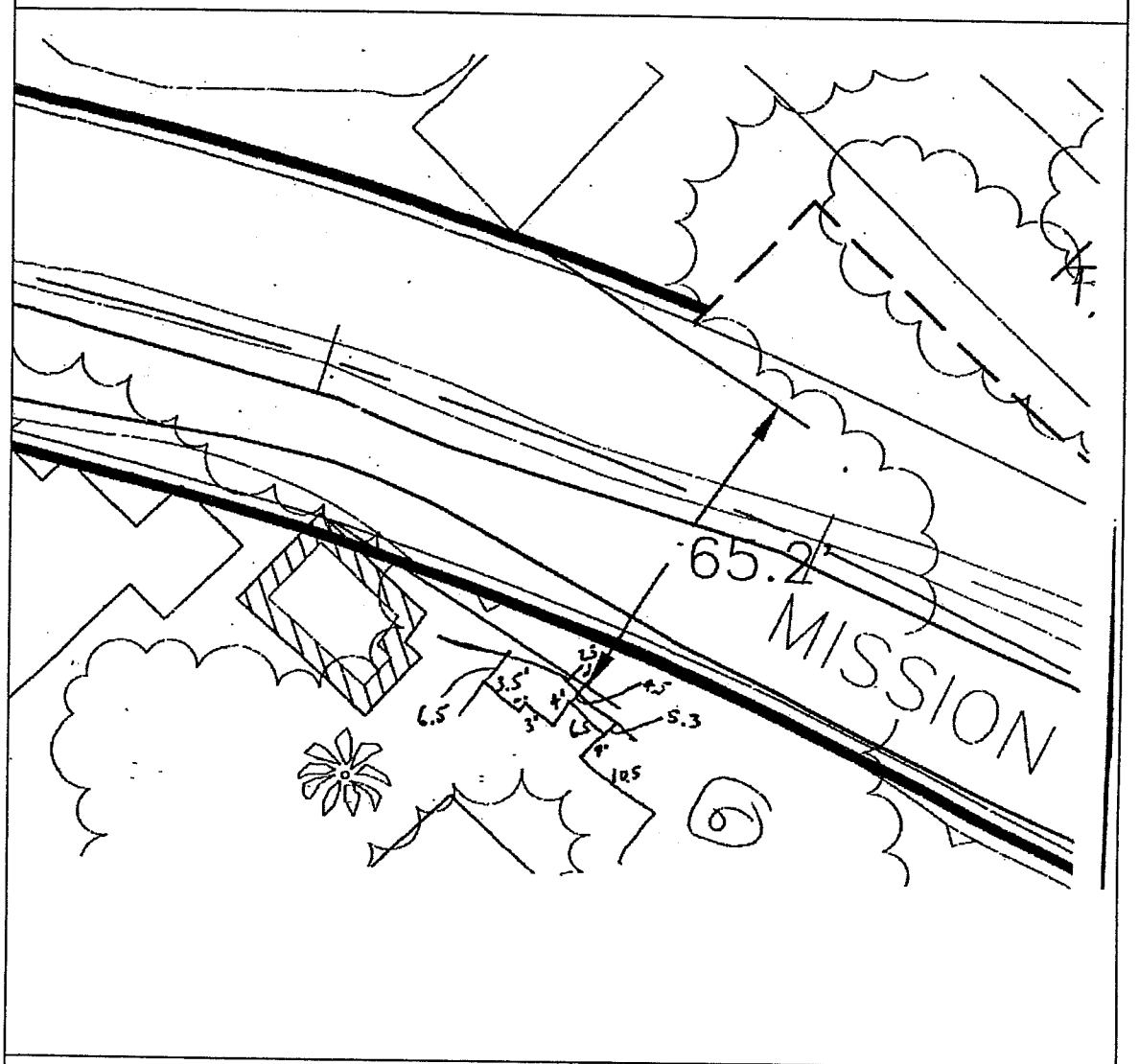
18-3 During the formulation of the alternative solutions, extending the box culvert down to the end of the project was not considered since it is contrary to some of the objectives of this study. However, an opportunity still exists in the future to reconsider this design feature, providedthat the City and the County request the Corps to do so. The feasibility of extending the box culvert has not undergone any engineering or environmental analyses; therefore, at this time, the Corps could not present an opinion on whether the culvert would be more advantageous compared to the current design or if at all feasible.

18-4 See response to comment 18-1.

	eliminate is flawed. We also take offense to the fact that the city hasn't to our knowledge had a team of experts determine whether or not this house is moveable; in fact, we have been advised that due to it's age and construction that it isn't.		
Comm 18-5	Regarding the installation of a walkway along the creek, we have concerns regarding lighting, security and the liability issue when someone falls into the creek near our property.	18-5	This project does not include walkways along the creek. Your comment refers to another project that the City may or may not pursue separately.
Comm 18-6	We understand that what we have received is a draft and issues need to be settled before you can receive complete environmental and community approval before May 2000.	18-6	The Final Report and the EIS/R would also be available for public review before its certification.
Comm 18-7	We are hoping that you will achieve a plan that can preserve the history, charm and beauty of the creek from Chapala Street Bridge to the end of Mission Creek.	18-7	Comment acknowledged.
	Best Regards, Gabrielle & Jerome Boucher Gabrielle and Jerome Boucher CC: Janice M. Hubbell CC: Ed DeMesa CC: Harriet Miller CC: Barbara Chen Lowenthal CC: Edward Cella CC: Sandra Tripp-Jones		

Bruce Burnworth
Penfield & Smith Engineers
963-9532




65.2'
MISSION
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Comm 19-1	Ms. Jan Hubbell, Project Planner City of Santa Barbara Planning Division P.O. Box 1990 Santa Barbara, Ca 93102-1990 Jan 20, 2000 RECEIVED JAN 24 2000 CITY OF SANTA BARBARA PLANNING DIVISION Dear Ms. Hubbell: The word "thrilled" is not strong enough to describe my happiness and excitement over the "re-creeking" of Mission Creek! Just last week, while searching for my lost Border Collie (still missing ...), I became extremely intimate with the Mission Creek creekbed and concrete channels. Despite my heartache over my dog, I still found myself increasingly angry with the powers-that-be in Santa Barbara for allowing Mission Creek to be concreted and thereby devoid of any wildlife, wildlife habitat or beauty. In the concrete parts, which seem(ed) to go on for miles, I was truly disgusted by all of the graffiti and other signs of human trash — mattresses, etc. The vegetated natural areas of the creek	Responses to the comments from: Lisa Ann Kelly 1724 Olive Avenue SB, CA 93101 19-1 Your support for the project is acknowledged. The Islay Street bank reconstruction project is outside of the Lower Mission Creek Flood Control Project area and has received permits from all of the necessary agencies. It is being inspected periodically to make sure that all conditions are being met.

CONTAINED MATED PAIRS OF MALLARD DUCKS (I SAW AT LEAST 10 PAIRS), AN EGRET, FROGS... IT WAS WONDERFUL.

WHILE I AM WRITING THIS LETTER TO YOU I WOULD ALSO LIKE TO EXPRESS MY DISMAY WITH THAT PROJECT AT ISLAY ST (NORTH OF ISLAY) AT MISSION CREEK. SEVERAL MORNINGS (7am & BEFORE) I STOOD ON THE BRIDGE, LOOKING FOR MY DOG & SAW TRUCKLOADS OF DIRT AND CONCRETE USED TO WIDEN THE HOME-OWNER'S BACK YARD —— INTO THE CREEK! SURELY SUCH A PROJECT IS ILLEGAL? AND THAT WALL WILL UNDOUBTEDLY CHANGE THE COURSE OF THE CREEK, CAUSING EROSION OF THE EAST BANK? (IS IT TRUE THE CITY OK'D THIS?)

THANK YOU FOR RESTORING MISSION CREEK. I & MY FAMILY HAVE ALWAYS LIVED IN DREAD OF FURTHER CONCRETE CHANNELIZATION OF MISSION CREEK. HERE'S TO NATIVE PLANTS & MORE WILDLIFE! HURRAH!!!

SINCERELY,

Lisa Ann Kelly & Family
1724 OLIVE AVENUE
SANTA BARBARA, CA 93101-1021

Comm 20-1	TO; CITY COUNCIL / JAN HORBELL REGARDING MISSION CREEK FLOOD CONTROL RECEIVED JAN 31 2000 CITY OF SANTA BARBARA PLANNING DIVISION LOS ANGELES AND SANTA BARBARA HAS FLOOD- ED FOR YEARS NATURALLY. LUCKY FOR LOS ANGEL- ES EARLY PLANNERS HAD SOME BRAINS, THEY IN- STALLED CONCRETE RIVERS & CREEKS. SANTA BARBARA ONLY SLIGHTLY SLOPES TO THE SEA. WHEN YOU RESTRICT FLOW WITH BUSHES, TREES & SHOPPING CARTS IN A NATURAL CREEK, WATER WILL GO TO THE PLACE OF LEAST RESISTANCE --- INTO THE CITY! ONCE AGAIN YOU ARE LISTENING TO A BUNCH OF ENVIROMENTALIST WHO WANTS EVERY- THING NATURAL. FOR THEM THEY SHOULD MOVE TO THE COUNTRY. AND THEN, THEY SHOULD BE IN A TEEPE ON TOP OF THE MOUNTAIN, LOOKING DOWN INTO A STREAM -- OTHERWISE THEY WOULD BE WASHED AWAY IN A STORM --- DA -- LIKE WE WILL BE. David Dates	Responses to the comments from: David Dates 20-1 The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciate your comments vital to the success of this flood control project. The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance of providing the residents of this area a higher level of flood protection, while improving the riparian community and aesthetics along the creek.

February 2, 2000

Ed Demesa
Study Manager
Plan Formulation Branch
US Army Corps of Engineers
P.O. Box 532711
Los Angeles, Ca. 90053-2325

Dear Ed,

Gay and I enjoyed meeting you and Col. Carroll at the Army Corps of Engineers Public Meeting in Santa Barbara on Jan 19, 2000 and at the Chapala Street Bridge before the meeting.

Attached is a letter that we wrote to Ian Hubbell outlining our views of the Lower Mission Creek Flood Control Project.

Comm 21-1 First of all, we would like to thank you for the good news that you gave us before the start of the meeting regarding the preservation of our house and historic sea wall at 116 Chapala Street. You confirmed what we have been told by the City of Santa Barbara, that there is now plenty of room to expand the creek to 60 feet (if necessary) and leave our side of the creek alone.

Comm 21-2 We are very interested in hearing more about your plans to build vertical walls in our section of the creek. After talking with Bruce Burnworth of Penfield Smith, we are under the impression that because our retaining wall is so high, that it probably will not be necessary to put a vertical wall in front of our house. Historically, there has never been an overflow onto our patio during flooding.

Comm 21-3 The box culvert extension plan presented by Mr. Romasanta at the meeting is an interesting one and hopefully will be explored by you and your associates. We were very encouraged by your attitude to do the best thing for this community and your openness to the ideas presented by the public.

Comm 21-4 Additionally, if the vertical walls collapse during a storm, who is responsible for replacing them and how long will it take to repair the damage? We are also concerned about the creek maintenance issues, at the neighborhood meeting on 1/4/00, we were told that clearing out/cleaning a box culvert was a simple procedure. If this is true, then, isn't that one more reason to explore the box culvert extension alternative?

Responses to the comments from:

Jerome and Gabrielle Boucher
116 Chapala Street
Santa Barbara, Ca 93101

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciate your comments vital to the success of this flood control project.

21-1 See response to comment 18-1.

21-2 At this time, the proposal is to replace the sandstone wall with an adequately designed structure. The existing wall would either be removed and replaced or kept in place and used as the back form to be covered by the new structurally adequate wall. Final decisions will be made during project final design.

21-3 See response to comment 18-3.

21-4 The maintenance and repair of the creek would be the responsibility of the County Flood Control District when the project is turned over by the Corps after construction. During the construction period, the Corps would share the maintenance responsibility. Any repair needed that could impair the function of the creek would be accomplished as soon as possible. Refer to the maintenance section of the Main Report for detailed information regarding this subject.

Thanks again for your help in ensuring that the historic Chapala Street neighborhood maintains its character, charm and importance to the City of Santa Barbara.

Regards,
Jerome and Gabrielle Boucher

CC: John Carroll- US Army Corps of Engineers

Janice Hubbell- City of Santa Barbara Planning Dept.

Eva Inbar
240 Arboleda Rd.
Santa Barbara, Ca 93110

February 3, 2000

Jan Hubbell
City of Santa Barbara Planning Division
P.O. Box 1990
Santa Barbara, CA 93102-1990

RE: Mission Creek; Draft EIR

Dear Jan:

Here is my idea of what I'd like to see happening at Mission Creek.
First and foremost, let's get rid of all that horrid concrete. The creek should have a natural bottom again, the banks planted with native vegetation. On the banks I'd like to see a little park, with a walk/bike trail and benches. It would function as a greenbelt and could one day go up all the way to the Mission. Vic Obern had this idea back in the 70ies, and I think it's wonderful!
A good example of how this could be done is the creek that goes through downtown San Louis Obispo. If they could do it, we can do it, too! Then Mission Creek would be a real asset to our city and not the pathetic, foul smelling embarrassment it is now.

Sincerely Yours,

Eva Inbar

Eva Inbar
Member of the SB Bicycle Coalition and the SB Livable Streets Coalition

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CITY OF SANTA BARBARA
PLANNING DIVISION

Responses to the comments from:

Eva Inbar
240 Arboleda Road
SB, CA 93110

22-1 The project would restore the streambed to a natural bottom along most of lower Mission Creek except for the sandstone channel that runs along the railroad tracks. No work is proposed along this reach. Several habitat expansion zones that would include some form of recreational design are already included in this project. These habitat zones would be located: 1) downstream of the Mason Street Bridge, 2) along Kimberly Avenue between the Chapala and Mason Street Bridges, 3) at the north side of Highway 101, 4) at the corner of Haley and De la Vina Streets, 5) between Bath and Cota Streets, and 6) on Castillo Street just downstream of Canon Perdido Street.

Your participation in the City's Creek Strategic Planning process is encouraged. This would be another opportunity to pursue additional betterment towards your vision of the future of this creek.

P.O. Box 626
Santa Barbara, CA
February 1, 2000

City of Santa Barbara
Planning Division
Attn: Jan Hubbell, Project Planner
P.O. Box 1990
Santa Barbara, CA 93102-1990

Dear Jan:

Thank you for setting up the Lower Mission Creek Neighborhood Meeting on January 4. All of us appreciate your efforts to keep us well informed.

I was unable to attend the January 19 meeting for the public comment as I was recovering from surgery. However, I did follow the meeting on television.

I urge you to strongly consider amending the present plan by extending the box culvert from the Chapala Street Bridge to Cabrillo Boulevard for several reasons:

Comm 23-1

1. In the EIS/EIR report of December 1999, Table 26 states under Act 6-8-12:
   "Category
   a. Public Health & Safety – Long Term: After completion of the project, it could be possible that people could enter within the creek bed and be injured. People may get into bypass tunnel and criminals may live and hide in culvert."

   Presently, we do have problems with a transient population spending time under the west side of the Chapala Bridge. If the culvert ends on the east side of the Chapala Bridge, these problems may increase.

Comm 23-2

2. From all reports I have seen, this project is expected to be very expensive for the city with the strong possibility that unforeseen costs may arise. I believe it was Rich Unterman who spoke and suggested that the culvert run under Chapala Street. If this were a possibility there would be quite an economic advantage to be gained by the city needing to take less right of way.

Comm 23-3

3. The widening of the lower portion of Mission Creek is needed because the culvert will empty out at the Chapala Bridge. Environmentalists reported that the canopy of trees could not cover this increased width to provide adequate shading needed to keep the stream the proper temperature to protect the endangered species now in the creek.

Responses to the comments from:

Gail Pierce O'Brien
PO Box 626
Santa Barbara, Ca 93102

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciate your comments vital to the success of this flood control project.

The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area a higher level of flood protection and improve the riparian community along the creek. In order to provide that increase in flood protection while maintaining the natural creek bottom and restoring the riparian corridor, widening the Creek is required.

23-1 Railing and fencing will be provided for safety reasons and to discourage inappropriate use of the creek. Local policing by the City should continue in order to address this potential problem.

23-2 During the Reconnaissance Study for this project, a proposal to divert part of the stormwater flows upstream was eliminated from further consideration since it was found to cost more and the excavation required along the streets could result in significant cultural resource impacts. In addition, it would result in the creek mouth being 500 to 1000 feet closer to the harbor mouth, resulting in greater siltation impacts to the harbor. Earlier attempts by the Corps to build a

Comm 23-4

4. The maintenance report was very unclear about costs to keep the creek clean. The wider width means increased sediment and vegetation. We could end up with an even more polluted creek than we have at present.

Comm 23-5

5. I did attend the January 29 Community Forum on Creek Water Quality and Creek Restoration. At this meeting I did learn that a culvert is much less expensive to maintain than a creek. I also learned that a very expensive plan to maintain all our creeks will probably need to be put before the voters. If this plan does not get voted in, how do we maintain lower Mission Creek so that it is attractive to tourists?

Comm 23-6

6. There are two other sections of the proposed plan which I question;

   a. It was admitted by the engineers that the present type of wall being suggested could trap water behind the wall (in the case of flood condition rains) and the wall would collapse and need to be rebuilt. Will the Army Corps of Engineers cover this cost? If not, is it in the budget?

   b. The use of one gallon trees for landscaping. We need much bigger trees and more of them.

Comm 23-7

Lastly, there appears to be a desire on the part of several individuals to use the creek to create a "tourist attraction". Some of these individuals wish the city to create public parks, etc. The creekside houses on Chapala Street between Mason and Yanonoli were all built in the early 1900's to provide various services for the Potter Hotel and when the hotel burned down were converted to single family homes and multi-family dwellings. Instead of destroying this part of Santa Barbara history, these homes could be included as part of the "tourist attraction". Plaques and a written guide could note the probable history of the structures and the architectural details of note. These guides could be included in a suggested walking tour of the neighborhood. There is a path from the end of Chapala Street to the Railroad Station and this would provide an excellent tie-in.

Many tourists take this walk today and I am sure the walk could be enhanced with the addition of the above material.

Thank you, again for your attention and consideration to the homeowners along lower Mission Creek. We do need a flood control project and wish to cooperate in every possible way.

Sincerely,

Gail Pierce O'Brien

diversion structure were met with strong opposition, would have increased costs and, at the request of the City and County, the idea was abandoned.

23-3 Creek widening is needed along the entire project reach to convey higher floodwater flows. The advantage of having the overflow culvert across the Oxbow is that it will avoid having to widen the creek across this reach and in the process destroy the historic sandstone wall along the railroad tracks and impact the row of properties south of this historic wall. The existing minimal shading will eventually increase when the new trees have grown to reasonable size and would not have impacts to the endangered species. See the Biological Resources section for a discussion of the shading study.

23-4 The cost of maintaining the creek is based on activities similar to current practices. However, it is anticipated that because of the wider creek and the vegetated features, a more involved maintenance plan will be required. The County has prepared a detailed maintenance plan outlining the activities required to maintain the creek in its design form. The maintenance plan includes trash removal and minimizes polluted materials in the creek.

23-5 A culvert is not necessarily less expensive to maintain than a creek. It sometimes requires specialized equipment and it may be more difficult to clean out when it is very long. The city is looking at ways to fund improved water quality and maintenance for all the creeks.

Mr. Olmen -

Please excuse the informality of this note —

I am attaching a copy of the letter I sent to Jan Hassell -

I feel strongly that the U.S. Army Corps of Engineers must take seriously the desire of so many Santa Barbarans to amend your present plan to extend the culvert to the beach.

Thank you —

Gail P. Olmen

23-6 In regards to your question about the adequacy of the wall, the depth of the footing for the toe and full height vertical walls were designed to prevent undermining and potentially catastrophic failure of the walls. To avoid undermining of the wall from behind, proper riprap sizes will be used.

In regards to landscaping, it is generally accepted that the resiliency and the mortality of the type trees propose to be planted along the banks could be greatly aided by growing them from nursery stock. For this reason, younger saplings would be used. Studies have shown that smaller, younger trees generally catch up with larger trees planted at the same time and in the same area. The number of trees and their spacing is mainly a function of the ability of the wall structure to allow a notch through the heel of the wall footing for the roots to penetrate through, and avoid potential undermining of the wall structure. The spacing could be reduced to perhaps 20' to 30'instead of 40'. However, modifications to the wall footing will be required and increases in construction costs could be expected. This opportunity could be pursued if the local sponsors would share the additional construction costs.

23-7 The City is completing a historic survey of the entire Waterfront area including both the West Beach and East Beach neighborhoods. One outcome of this survey may be the creation of a Waterfront Area walking tour, similar to the walking tour, similar to the walking tour pamphlets for Downtown that already exist.

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CITY OF SANTA BARBARA
PLANNING DIVISION

City of Santa Barbara
Lower Mission Creek
Flood Control Project
EIR/EIS

February 7, 2000

To Whom It May Concern:

My name is Dennis Hoey, my wife and I are the new owners of the property located at the corner of Ortega and Bath Streets. The proposed revised plan #12 identifies two structures on my property as possible acquisition sites, the addresses are 306 Ortega and 308 Ortega. It is our intention to make public our concerns and disapproval of the plans to widen the creek at the Ortega Street bridge. We are aware of the need to increase capacity, but feel that a wider creek bed in this area can be avoided by constructing a steeper wall and deeper channel. This modification may help save these two dwellings on our property as well as reduce the area affected on the other side of the bridge. One of the structures in review, 306 Ortega, is possibly an historic structure. If this is the case, then 308 Ortega would not be necessary to remove since it is right next to 306 Ortega and would not gain any real benefit to the creek bed. The other obvious effect of the removal of these dwellings is the impact on the low income families that live in these houses. The family in 306 Ortega has been living there for over ten years raising their children and would face a financial hardship if forced to move. We ask that all consideration be given to constructing a steeper wall to support the creek side embankment along our property.

Thank you for your attention,

Dennis Hoey

Responses to the comments from:

Dennis Hoey

24-1 At the request of the City, the proposed Alternative 12 has been modified to have vertical walls extend from the Ortega Street Bridge northwards across the properties located on 306 and 308 Ortega Street. This modification would preserve the historic 306 Ortega building and reduce project cost by avoiding acquisition of the 308 Ortega Street residence.

February 7, 2000

Jan Hubbell
Project Planner
City of Santa Barbara
P. O. Box 1990
Santa Barbara, CA 93101

Re: Lower Mission Creek Flood Control Preliminary EIR

Dear Ms. Hubbell,
My wife and I have been residents of the Creekview Apartments at 719 Bath St. #7 for 12 years. Our reason for moving here was Mission Creek. We have a very stressful job as owners of a local moving and storage company; our greatest relief after a long day has been our sanctuary next to the creek. We have survived the storms of 1995 and 1998 when we lost half of our yard during these events.

From the plans that we have looked at, it seems that you want to take our trees and more of our yard from us. This is not acceptable. The trees provide privacy, shade and comfort for all of us living in the apartment complex as well as a habitat for many birds and other wildlife. The yard provides food and mental health for all. The creek provides for frogs, fish, birds, opossums, raccoons, skunks, etc. Please do not take this away from us! We personally go into our creek daily to check for and remove garbage and debris. We feel that it is very important in all of our lives that we protect the natural resources that we have left and do our part to help keep them clean and pristine for generations to come.

If we can help in any way to keep what we have, love and cherish ours, please let us know what we can do. We would be more than glad to help in any way possible.

Thank you very much,
Eduardo and Marite Gonzalez
Concerned residents and future homeowners in Santa Barbara

Ps. We've been in Santa Barbara since 1962.
What about the State and Cabrillo slough?

Cc: Pat Kelley, City of Santa Barbara
Karl Treiburg, County Flood Control
Colonel John Carroll, Army Corps of Engineers
Ed Demesa, Army Corps of Engineers
Wanda Michalenko, Urban Creeks Council

Responses to the comments from:

Eduardo and Marite Gonzales
824 Cacique St.
Santa Barbara, CA 93103

The Corps of Engineers, the Santa Barbara County Flood Control District and the City of Santa Barbara appreciate your comments, vital to the success of this flood control project.

25-1 The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area with a higher level of flood protection and improve the riparian community and aesthetics along the creek. In order to provide an increase in flood protection while maintaining a natural creek bottom and restoring the riparian corridor, widening the creek is required. This will impact numerous properties and resources along the creek. As the riparian corridor begins to establish after construction activities, we expect the resources and wildlife to reestablish and return to the area.

February 7, 2000

Jan Hubbell
Project Planner
City of Santa Barbara
P. O. Box 1990
Santa Barbara, CA 93101

Re: Lower Mission Creek Flood Control Preliminary EIR

Dear Ms. Hubbell,

As a renter at 719 Bath St. #9 this proposed plan would have direct impact on me.

The top of the bank would run right through the garden that all of us here have spent many years enjoying and cultivating. I see no harm in leaving the yard as is. The channel can handle the water if the bridge crossings are kept clear. I have witnessed this myself.

The environment we have here includes many animals. One: the frogs, every year we have a chorus of song. The heavy equipment necessary to construct the proposed project would kill thousands of frogs and pollywogs. What will you do to prevent the mass murder?

Two: the birds that live here, right here, at this spot, who have been coming here for years will be forever disrupted. Every year we have many pairs of mating ducks that raise their babies right outside of my window. I have enclosed pictures. How will you protect this mating spot?

Three: for years I have come home at night and watched the raccoons wandering up the creek. I've watched the females carrying their babies year after year. What is going to happen to their homes in the creek?

In this small corridor, there is abundance of wildlife right in downtown Santa Barbara and I would like to see the least amount of disturbance to this wonderful habitat.

If you do not get the water out to the sea at the bottom of the channel in the first place, all this work is worthless.

Thank you,
Peter Gerlach

Cc: Pat Kelley, City of Santa Barbara
Karl Treiburg, County Flood Control
Colonel John Carroll, Army Corps of Engineers
Ed Demesa, Army Corps of Engineers
Wanda Michalenko, Urban Creeks Council

Responses to the comments from:

Peter Gerlach
719 Bath Street #9
Santa Barbara, Ca 93101

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciates your comments vital to the success of this flood control project.

26-1 Please see response to comment 25-1.

Comm 27-1

Harbor View Inn

February 8, 2000

Mr. Dan Young
Assistant Chief, Planning Division
U. S. Army Corps of Engineers
Los Angeles District
911 Wilshire Boulevard
Post Office Box 532711
Los Angeles, California 90053-2325

Subject: Comments re EIS/EIR December, 1999,
Lower Mission Creek Flood Control Feasibility Study

Why Double the Size of Sewer Lagoon, the Ugliest Thing in Town?

Dear Mr. Young:

Preliminary Statement

I am the managing partner of the owner of the property bounded by Cabrillo Boulevard, Chapala, Mason and State Streets. The Mission Creek tidewater lagoon runs through the center of our property. We are the bottom of the funnel, so to speak, of Mission Creek and get the most amount of flood waters generated during heavy rainfall in the Santa Ynez mountains and foothills which drain into Mission Creek and then to the Pacific Ocean.

Because of our location, I have, since 1983, been an ardent supporter of the Corps' numerous and continual efforts to assist the city and county of Santa Barbara in constructing an appropriate flood control project that will minimize flood damage. I believe that, with a slight design modification to Alternative 12, that alternative offers the best flood control protection to my property and the community under all the circumstances that must be considered.

There are three major points that override all others, namely,

Overlooking Stearns Wharf.
28 West Cabrillo Blvd. • Santa Barbara, CA 93101 • Telephone (805) 963-0780
Fax: (805) 963-7967 • Toll Free Reservations: (800) 755-0222

Responses to the comments from:

Antonio Romasanta
Harbor View Inn
28 W. Cabrillo Blvd.
Santa Barbara, Ca

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciate your comments vital to the success of this flood control project.

27-1 The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area a higher level of flood protection and improve the riparian community along the creek. In order to provide that increase in flood protection while maintaining the natural creek bottom and restoring the riparian corridor, widening the Creek is required. This will impact numerous properties and resources along the creek.

We appreciate your knowledge and understanding of the requirements that led to the design of the recommended plan. The new channel designed to convey stormwater flows up to 3400 cubic feet per second (3400 cfs) will require that the channel to be widened to 60 feet across your property. The top of bank or top of wall for this design (60-ft wide) would generally follow the existing topography of the area. During the Pre-construction Engineering and Design (PED) phase of the project, when additional detailed analyses are performed, design

1. Whatever capacity is needed through Mission Creek in order to achieve the projected 20-year flood control protection must be provided;

2. The numerous environmental and ecological concerns must be considered; and

3. We do not need to double the size of sewer lagoon, the ugliest thing in town, in order to satisfy items 1 and 2 above.

The continuation of the proposed culvert through the railroad station property down to the Chapala Street bridge, if continued down to the State Street bridge, is the design modification being suggested, and it seems to have widespread support from all the boards, commission and City Council of the City of Santa Barbara. I understand that such a design modification, which would extend the culvert from approximately the Chapala Street bridge to the State Street bridge, is an item that can be incorporated into the project as a supplementary design consideration.

Discussion

My comments pertain to that section of Mission Creek immediately south of the Santa Barbara city railroad station to the State Street bridge.

First and foremost, this project is and must be a flood control project that meets the cost/benefit ratio objectives established by statute. It has been determined preliminarily that the width from the top of the banks in Mission Creek, from approximately the Chapala Street bridge in the approximate area of the intersection of Yanonali and Chapala Streets south to the State Street bridge, needs to be 60 feet in order to provide the conveyance capacity for flood waters necessary to achieve a 20-year flood control protection. I believe that width can be reduced to approximately 50 feet in the very lower reach from Mason to State Street by raising the height of the vertical walls through that reach. That would be much preferred for reasons cited below.

In any event, whatever is ultimately determined in terms of the width of the channel, property will have to be acquired to provide the necessary flood control protection. I would point out that the cost of condemnation in this highly urbanized setting will be very expensive, and understandably

refinements to reduce the creek width will be reconsidered.

At the request of the local Sponsors, the concept of extending the culvert down to State Street or Cabrillo Boulevard could be investigated during the PED phase as a design refinement. The feasibility of extending the box culvert has not undergone any engineering and environmental analyses at this time; thus, the Corps could not present an opinion on whether the longer culvert would be feasible and more advantageous compared to the current design.

Regarding overall water quality concerns, see response to comment 12-16. Regarding shading, see the shading study incorporated into the Biological Resources Section of the EIS/R.

so. This area is zoned for hotels. It is a huge income-generating activity for the city of Santa Barbara. Therefore, it is practical to consider reducing unnecessary condemnation costs along with the many other benefits a smaller stream bed will achieve.

Environmental Concerns

The policies in the city's Certified Local Plan, section 6.8, provide that the riparian resources, biological productivity, and water quality of the city coastal zone creeks, shall be maintained, preserved, enhanced and, where feasible, restored.

The California Legislature, in the Environmental Quality Act, section 21000, finds and declares in paragraph (b):

"(b). It is necessary to provide a high-quality environment that at all times is healthful and pleasing to the senses and intellect of man."

Enclosed as **Exhibit A** is a statistical analysis of the amount of flood days one could expect at Mission Creek in a 5, 10 and 20 year period. The percentages for each, respectively, are .0438, .00219, and .003136. Therefore, it is obvious that during the vast majority of the time, we are not dealing with a flood situation. It is critically important that the public and the decision makers are aware that the waters that occupy the area from the Pacific Ocean to approximately the Santa Barbara railroad track along Mission Creek consist primarily, probably approximately 95% or more of the time, of brackish ocean water. Furthermore, it is equally important that the EIS/EIR state that this area, and the water contained therein, is subject to and dominated totally by tidewater fluctuations which occur approximately every 6 hours and 15 minutes. Many times at low tide there is little or no water in Mission Creek, and it is essentially a mud hole, as depicted in **Exhibit B**.

To the extent that the channel is widened to 60 feet, the mud hole is doubled in size. The current width of the stream bed a short distance north of the State Street bridge and up to the railroad tracks is approximately 25 feet. When there is ocean water in this stretch, it has been historically polluted to the extent that this polluted body of water is currently known as sewer lagoon (depicted in **Exhibit C**),

which, when it drains to the beach, causes East Beach at Mission Creek to be posted for bacterial pollution. In fact, in 1998, that area was open to the public only 63 days. See **Exhibit D**, a report contained in the Santa Barbara News-Press May 30, 1999, page A 16.

Obviously the reasons for such pollution are beyond this letter and the EIS/EIR. Needless to say, the county and city are working on it, must work on it, and hopefully there will be some improvement in the future. However, doubling the size of sewer lagoon of course will make it more difficult to clean up and of course increase the amount of polluted waters which ultimately go to the beach and thereby cause its closure.

Page 10 of the current EIS/EIR points out the necessity of reducing the size of the flood control channel if at all possible in order to maintain the coolest water condition for fish passage with minimum sun exposure. It will be exceedingly difficult, if not impossible, if the width from top of bank is 60 feet, to plant trees that will create the necessary shade and canopy over this stretch of the flood control project.

It is essential that the current environment of the creek, its current width, not be diminished. However, it need not be increased to 60 feet.

Why Double the Size of Sewer Lagoon, the Ugliest Thing in Town?

The current Alternative 12 proposes an underground culvert from approximately Highway 101 to the Chapala Street bridge located at the intersection of Yanonali and Chapala Streets. I suggest a study be made of the feasibility of extending that box culvert adjacent and parallel to Mission Creek, down to State Street adjacent to the existing Mission Creek channel, in order to provide the needed capacity for the flood control project. Therefore, between the capacity provided for in the existing channel of Mission Creek and the proposed extension of the box culvert, this project will have the needed capacity the Corps' engineers have said is required to attain a 20-year flood control project.

Such a concrete culvert, as depicted in yellow on **Exhibit E**, would create the following very desirable opportunities:

1. The existing Mission Creek narrower channel will be maintained with its ecological and biological aspects intact.

2. Plantings could be installed on top of that concrete culvert by placing dirt and planter boxes thereon, thereby creating from the State Street bridge, where the overwhelming number of people pass, some 200,000 on a weekend during he tourist season, what is depicted in **Exhibit F**. Again it is important to point out that 99.9% of the time we do not have a flood going on, and we should be concerned about achieving the policy that the California Legislature has set forth in the above-quoted section 21000.

3. The top of the box culvert, at the City's election at an appropriate time in the future, could be utilized as a beautiful pathway from the railroad track to the corner of State and Cabrillo Boulevard. One can visualize appropriate lighting and surface and clean water, hopefully with steelhead migrating up the creek to spawn in the upper reaches of Mission Creek.

All of this could be possible provided sewer lagoon is cleaned up, and provided sewer lagoon is kept to a size that is manageable, which will permit the canopy and trees to have the necessary beneficial effect on the waters to provide the most conducive environment for the creatures that might be found from time to time in the tidal lagoon.

I realize and appreciate that the design modification suggested is one that cannot be part of the current project, but needs to be considered as an add-on or an enhancement.

Very truly yours,

ANTONIO R. ROMASANTA

ARR/abs
Enclosures

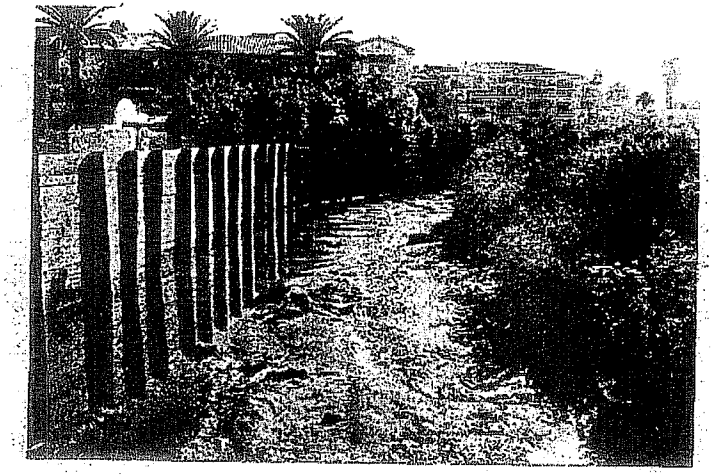
cc: Janice M. Hubbell, AICP
Project Planner, City of Santa Barbara

Flood Years since 1900 (Pg. 17 - Flood History) (Pg. 13 - Problem)

1904
1907 Jan 11
1909 Jan 28
1911 Jan
1914 Jan 25 + 25
1918 March
1938 March
1941
1943 Jan.
1952 Jan 12-16 - several times (P. 21)
1955
1958
1962
1964 November (P. 22)
1967 June (P. 22)
1969 Jan 26 (P. 23)
1993
1998 Feb (P. 23)
1960 1 day (P. 23)
1983 1 day (Jan.) (P. 24)
1985 Jan 10-12 / March 10-12 - 6 days (P. 24)
1998 Feb 23 - 2 days - (P. 26)

1950-2000
50 years - 7300 days - 10 flood days = .0013698 (1% = 73 days)
1990-2000
10 yrs - 3650 day - 8 flood days = .0021917 (1% = 36.5)
1995-2000
5 yrs - 1825 days - 8 flood days = .0043835 (1% = 18)

Exhibit A



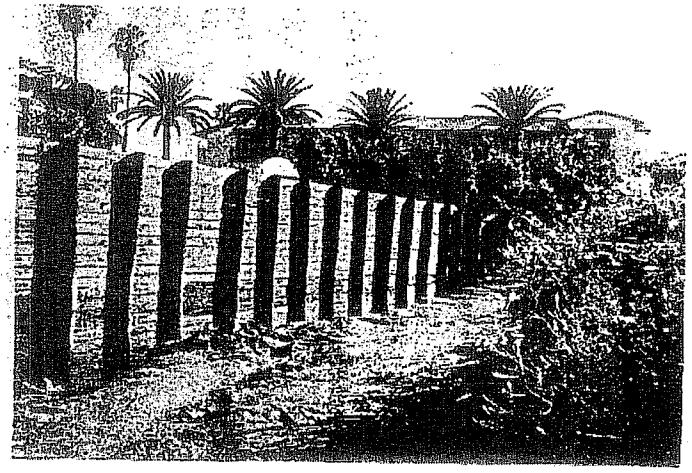


EXHIBIT B

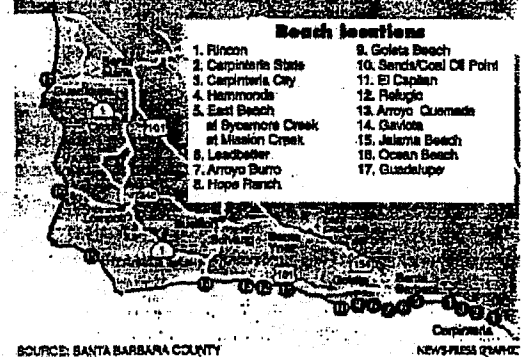
SEWER LAGOON

EXHIBIT C

County beaches in 1998: From worst to best

Below is a ranking of beaches for bacterial pollution during 1998. The beaches were ranked [illegible] days at warnings [illegible] days at advisory [illegible] days closed [illegible] days open [illegible] not beach [illegible]

	Days closed	Days at advisory	Days open
East Beach at Mission Creek	161	140	63
Arroyo Quemada	[illegible]	[illegible]	[illegible]
Rincon	106	224	35
Jalama	[illegible]	[illegible]	[illegible]
Carpinteria State	58	266	42
Arroyo Burro	[illegible]	[illegible]	[illegible]
East Beach at Sycamore Creek	28	210	126
Refugio	[illegible]	[illegible]	[illegible]
Hammonds	21	169	175
Hope Ranch	[illegible]	[illegible]	[illegible]
Ocean	7	329	28
Gaviota	[illegible]	[illegible]	[illegible]
Leadbetter	7	112	245
Guadalupe	[illegible]	[illegible]	[illegible]
Sands/Coal Oil Point	7	70	257
Goleta Beach	[illegible]	[illegible]	[illegible]
El Capitan	0	84	280
Carpinteria	[illegible]	[illegible]	[illegible]



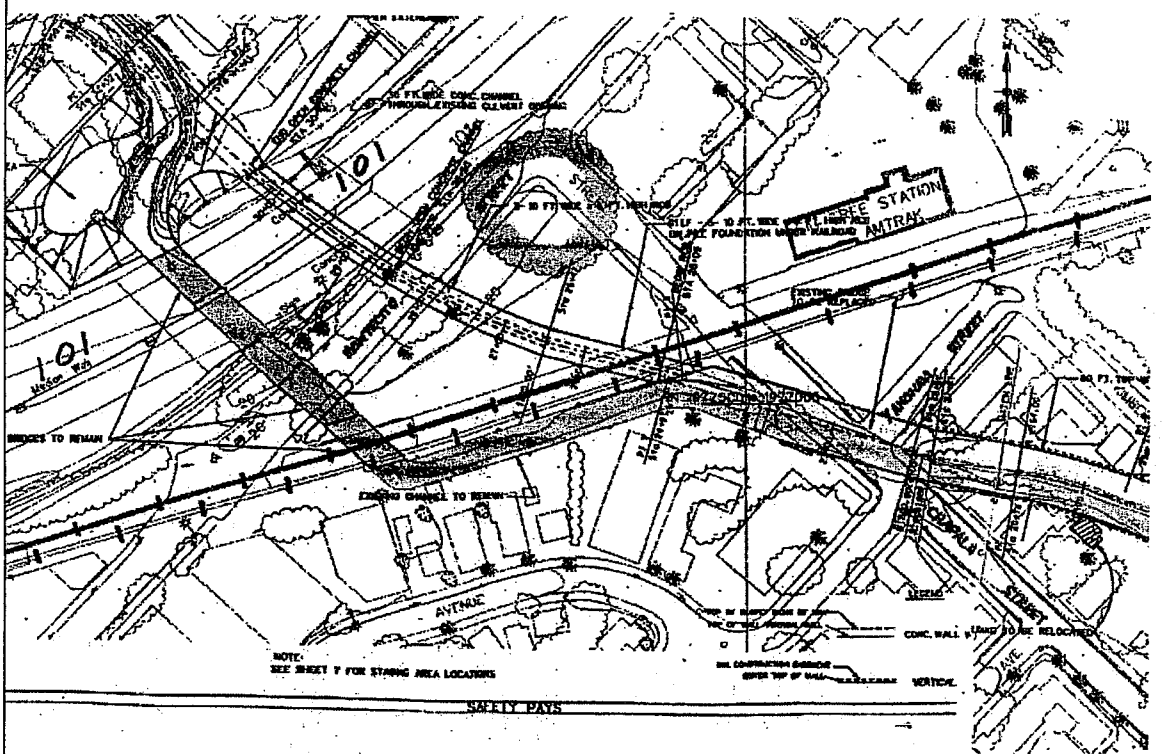
SOURCE: SANTA BARBARA COUNTY

NEWS-PRESS GRAPHIC

EXHIBIT D

Asphalt Parking
CONC. WALL WITH RIPRAP SIDESLOPE
71 FT. TOP WIDTH
CONC. WALL WITH RIPRAP SIDESLOPE
BUILDING TO BE REMOVED
60 FT. TOP WIDTH
STREET
MASON
STREET
CARROLL
BLVD.
EXISTING BRIDGE TO BE REPLACED
LEGEND
VERTICAL WALL ON RIP-RAP FOOTING
VERTICAL WALL OR PER FOOTING
EXHIBIT E
LOWER MISSION CREEK FEASIBILITY STUDY
SANTA BARBARA COUNTY, CALIFORNIA
500 CFS ALTERNATIVE
RIPRAP SIDESLOPE WALL ALTERNATIVE
ALTERNATIVE II

SAFETY PAYS


101
101
STATION
AMTRAK
BRIDGES TO REMAIN
EXISTING CHANNEL TO REMAIN
AVENUE
STREET
NOTE:
SEE SHEET 7 FOR STAGING AREA LOCATIONS
VERTICAL

SAFETY PAYS

EXHIBIT F

Comm 28-1

Elihu M. Gevirtz
1736 Grand Avenue
Santa Barbara, CA 93103-1921
(805) 898-7998

February 8, 2000

U.S. Army Corps of Engineers, Los Angeles District
Planning Division, Water Resources Branch
P.O. Box 532711
Los Angeles, California 90053

RE: Lower Mission Creek Flood Control Draft Feasibility Study & EIS/EIR

Dear Sir or Madame:

I have reviewed the Draft Main Report and EIS/EIR, dated December 1999, and offer the following comments as a private citizen. As a resident of this community for nearly twenty years, I am somewhat aware of some of the valuable resources of this creek as well as its flooding potential.

I respectfully suggest that an additional component be added to the project or developed jointly while the present plan is finalized. This would be a 100-year plan for lands adjacent to the creek from the Botanic Garden downstream to the estuary at the beach. It could be done simply and quickly, with no delays of the principal project. The plan would include ~~three~~ two parts.

Part I: Land Acquisition. All parcels within 100 feet from the top of both banks would be mapped with parcel ownership, locations of structures and other pertinent data. (Most of this is probably done already or is very easily obtained.) As these properties come for sale on the market over the next 100 years, they would be purchased by a public entity. (Probably in most cases, the City of Santa Barbara.) This could be funded by a combination of sources including an annual amount on the order of $300,000 from the City's Redevelopment Agency that could render $30,000,000 over the life of the project, not including interest. This could be graduated up to $500,000 per year, generating an additional $25,000,000 or more.

These funds could be matched 1:1 or perhaps at a greater ratio by FEMA (the Federal Emergency Management Agency). I believe that FEMA is presently engaged in a similar project in an area of historic flooding, the lower Mississippi River. It makes sense financially because public funds are spent once, rather than several times in the process of rebuilding homes or repairing damage in the floodway. The Army Corps of Engineers also has funds for these types of projects and may be able to contribute. Together, these three sources alone could provide $150 million or more over the life of the project. Private charitable foundations might be happy to add to the program.

This may seem like a lot, but in Santa Barbara's Mission Creek and Laguna Channel there was more than $17 million of flood damage in 1995 alone (Table 3, page 35). The average annual risk is expected to be $3,555,000 without the presently proposed project (Table 36). Multiplied by 100 years, flood damage would cost local citizens and local and federal governments $355,500,000.

The primary flood protection benefits would be removing the structures that are presently most threatened by flooding. Presently, there are only 2.35 acres in the project study area (from Canon Perdido to the beach)

Responses to the comments from:

Elihu Gevirtz
1736 Grand Avenue
SB, CA 93103

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciate your comments vital to the success of this flood control project.

28-1 The economic requirements for Federal participation could not support the relocation of all the structures found within the floodplain as you are suggesting. This approach was considered during the Reconnaissance phase of this study. However, very little space is available in Santa Barbara to relocate the affected structures out of the floodplain. Additionally, this study focused on the general recommendations of the Lower Mission Creek Consensus Group, which did not suggest relocation of the structures within the floodplain. Due to foreseeable lack of Sponsor support, this idea was not considered further. Also, see response to comment 12-3.

including 73 lots owned by 63 different people (page 33). A wildly crude estimate, indicates that the total number of affected properties from the Botanic Garden to the beach may be on the order of 300 parcels. I imagine the Economic Community Project would have much more accurate data readily available. Purchase of this many parcels from willing landowners could reasonably be done within a 100-year time frame. At today's prices, purchase of 300 parcels could cost $90 million or more. Clearly, land costs will be significantly higher toward the end of the 100-year period. Even if this number triples, compared to the total costs of potential flood damage, this admittedly crude calculation, makes such an investment seem worthwhile.

Even if not all parcels are purchased (certainly, not all will be), removal of the structures on acquired property could eventually also be used to pay for restoration of the stream channel to vegetated earthen banks, and planting the remaining land with oaks, sycamores and cottonwoods in a pleasant park-like setting. Of course, it would have other benefits as well, particularly in the areas of improved water quality for humans and riparian habitat restoration for steelhead trout, red-legged frogs, southwestern pond turtles and other species. It could also provide numerous public recreation opportunities for passive parks with picnic tables and benches, nature trails and a bikeway from the ocean to the mountains. It would enhance the quality of life in existing neighborhoods, increase the attractiveness and vitality of the City's commercial core (like downtown San Luis Obispo for example), provide educational opportunities and enhance existing activities at the Botanic Garden and the Museum of Natural History.

Comm 28-2

Part II: Policy Revisions. The City's setback policy for structural development is 25 feet from the top of bank, if I understand it correctly. This is clearly inadequate to protect these homes from flooding even in 25-year events as shown in Exhibit 5. One of the problems with permitting structures this close to the creek is that it usually leads to hard bank protection (building a wall or other structure to protect the property) which diminishes the ecological value of the creek. It also increases the need for channel maintenance and other flood control activities that increase public expenditures. It therefore seems prudent for the City to adopt a minimum 50-foot buffer from the top of bank for all new development along the creek and to prohibit any structural additions or paving on properties in this zone.

Thank you for consideration of these comments. I offer my assistance toward development of this plan. I look forward to hearing from you.

Sincerely,

Elihu M. Gevirtz

Cc: Congresswoman Lois Capps, Supervisor Naomi Schwartz, Mayor Miller, City Council and Planning Commission, Tom Fayram, Dave Davis, Don Olson, John Patton, Pedro Nava, Mark Capelli, Jim Neuman, Bud Laurent, Westside Community Group, John Clark, Dianne Noda, David Pritchett

28-2 See responses to comments 12-3 and 12-4.

February 9, 2000

Jan Hubbell, Director
Santa Barbara City Planning Office
630 Garden Street
Santa Barbara, CA 93101

Dear Ms. Hubbell:

Comm 29-1 I am writing to you about the proposed plans for the Lower Mission Creek Flood Control Project (Preliminary EIR). As a resident who lives next to the creek, I would like to voice my concerns regarding the proposed plan.

For six years I have resided at the Creekview apartment complex at 719 Bath Street. My apartment faces the section of Mission Creek under review. My windows look out over the creek and I have happily watched the changing eco-system of the creek and the wildlife it supports. I have also witnessed the damage rising waters can do. The flood of 1995 was, of course, the most dramatic instance of this. It is reasonable and prudent for the City to address the recurring problem of flooding. But after reviewing the Army Corps' plans for flood control, and while the plans are still in the deliberation stage, I have objections to a specific component of the plan.

Comm 29-2 I am worried that widened the creek bed will alter the creek's feature in two significant ways. First, widening the creek requires the removal of adjacent property and thus of the surrounding trees. The trees (sycamores, fruit-bearing zapotes, and bottlebrushes) provide a canopy shading the banks and the creek bed bottom. Shade provides protection for the animal and plant life living along the creek. Frogs, ducks, egrets, and small birds all visit the creek as do larger animals such as raccoons and possums. Removing the trees will destroy their habitat.

Comm 29-3 Second, the rainy season produces short periods of intense rainfall, but much of the time only a modest stream flows down the creek. By widening the creek to the proposed widths I fear that the creek will become a dusty, arid rock bed for ten to eleven months of the year. This will undoubtedly put more stress on the wildlife that uses the creek.

Comm 29-4 My understanding is that most of the widening will involve property from one side of the creek. Perhaps the City would consider: 1) removing ground from both sides of the creek; and, 2) scaling back the proposed width. These alterations would not greatly change the Flood Control plans and would lessen the damaging effects to Mission Creek. I ask that the City planners please take my concerns into consideration when making your final decisions.

Responses to the comments from:

Lisa Torres
719 Bath Street, #6
SB, CA 93101

29-1 Comment acknowledged.

29-2 See response to comment 25-1.

29-3 The streambed would still support a controlled amount of vegetation growth. Intermittent removal of vegetation in a mosaic pattern would be performed to maintain the flood control purpose. Additionally, see response to comment 12-4

29-4 The widening of the creek necessary in order to carry larger stormwater flows results in property impacts to practically everyone along the creek, some greater than others. Alternative 12 finds a balance between increasing flood protection and restoring or preserving the riparian corridor. Throughout the plan formulation process, additional care was taken to minimize impacts to properties and structures. Whenever feasible, alternative designs were used to avoid removal of structures. However, in some cases, alternatives could not be found. During the final design of the plan, other design refinements would be considered to further minimize impacts to adjoining properties.

Sincerely,

Lisa Torres
719 Bath Street, #6

LT

Comm 30-1

PRESERVATION PLANNING ASSOCIATES

February 9, 2000

Ms. Janice M. Hubbell, Project Planner
City of Santa Barbara Planning Division
P.O. Box 1990
Santa Barbara, CA 93102

RECEIVED
FEB 10 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

Dear Ms. Hubbell:

We wish to comment on the Draft EIS/EIR for the Lower Mission Creek Flood Control Project, dated 1999.

A number of historic buildings and structures have been identified along the proposed creek corridor, not all of the same level of significance. It is our opinion that the most significant resources along the stretch of Mission Creek under question are: the pony truss bridge at Chapala Street (1920), one of only four remaining of its type in California; the Mission Creek Diversion (1905) listed in the National Register of Historic Places as a contributing member of the Railroad Depot; and the residences along Chapala Street (116, 118, and 120) and at 20 W. Mason Street, which were identified as contributors to a potential NRHP Waterfront Neighborhood or Potter Hotel district.

We ask that the project use design methods, such as the box culvert and/or slight realignment of the creek, that insure that the above resources are retained in place. These suggestions are found in Section 18.4 Residual Impacts (p. 18-32). In this way there will be no significant unavoidable impacts to these historic resources. It is our opinion that HABS recordation of the bridge and Mission Creek diversion would not be sufficient mitigation for their removal or realignment.

The small concrete bridge near the pony truss bridge has been identified as the Potter Hotel footbridge. Judging from historic photographs of 1925, this footbridge was associated with the Seaside Hotel, built in the 1920s after the Potter Hotel burned, and not with the Potter Hotel. The entrance to the Potter from the railroad depot was further south.

Within this Mission Creek project the environmental and cultural resources interests sometimes appear mutually exclusive: do we have a park or keep a building? We ask that as the project progresses and decisions are made, the cultural resources and environmental benefits be kept in balance.

Sincerely,
David Shelton
Alexandra C. Cole

Responses to the comments from:

David Shelton and Alexandra Cole
Preservation Planning Associates
519 Fig Ave.
SB, CA 93101

30-1 See response to comment 5-1. Additionally, at the request of the City and the County, several design refinements have been included into the recommended alternative. These modifications would result in the preservation of all of the historic structures that were initially impacted except for a short portion of the sandstone wall downstream of the Chapala Street Bridge. The Chapala Street Bridge and the Potter Hotel Footbridge would no longer be removed as a result of extending the culvert and aligning it alongside the sandstone wall and the Bridge.

RECEIVED
FEB 10 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

February 9, 2000

Ms. Jan Hubbell, Project Planner
City of Santa Barbara
P.O. Box 1990
Santa Barbara, CA 93101

Re: Lower Mission Creek Flood Control Preliminary EIR

Dear Ms. Hubbell:

Comm 31-1 I am writing to you as a resident of the Creekview Apartments at 719 Bath Street. I was living at that address during the 1995 flood and barely got my car out before the carport flooded. However, after that time, measures were taken by our property owners to shore up the bank with a natural stone wall which is functional and attractive. It would be unfortunate to negate the thought and expense that was undertaken to protect our living area.

Comm 31-2 It is gratifying to see that the proposed plan does not turn Lower Mission Creek into a concrete channel. The music of the frog chorus and other visits by wildlife would be greatly missed.

Comm 31-3 After looking at the map in the Feasibility Report, I do have some concerns regarding the widening of the creek at our location. It looks like an inordinate amount of land would be taken form the lower side of the creek where the buildings are closer and more vulnerable should flooding occur. Personally, the loss of property would deprive our complex of our community gathering area and would destroy trees that give shade and privacy to the units that face the creek.

I am hoping that an equitably solution can be found for all those affected by the proposed plan. Thank you for your consideration of these concerns.

Sincerely,

Rita Gronhovd

Responses to the comments from:

Rita Gronhovd

31-1 The widening and realigning of the creek would result in the removal of most of the existing creek banks. Except for the vertical wall located immediately upstream of the De la Guerra Street Bridge and the sandstone channel along the railroad tracks, all creek banks would be replaced with a more structurally adequate bank protection.

31-2 Comment acknowledged.

31-3 See responses to comments 25-1 and 29-4. Additionally, the canopy that would eventually be provided by the planting along the riprap sideslope, would restore the shading and privacy you now enjoy. See the shading study included in the Biological Resources Section of the EIS/EIR.

LAW OFFICES OF JANA ZIMMER
2640 Las Encinas Lane
Santa Barbara, CA. 93105

Phone: 805/563-1591 Fax: 805/687-4156 email: jzimmer@rain.org

CITY OF SANTA BARBARA
PLANNING DIVISION

February 9, 2000

Ms Jan Hubbell
City of Santa Barbara
Community Development Department
630 Garden Street
Santa Barbara, CA. 93101

Colonel John Carroll
U.S. Army Corps of Engineers
Los Angeles District
P.O. Box 532711
Los Angeles, CA. 90053

BY FAX and MAIL **By Fax and Mail**

Comm 32-1 **RE: Lower Mission Creek Flood Control EIS/EIR**

Dear Ms. Hubbell and Col Carroll:

I represent Teddy Gasser and Carlin Moyer, the owners of a nine unit apartment building at 719-723 Bath Street, along the stretch of Mission Creek between Ortega and De La Guerra Streets. The purpose of this letter is to provide comment on the draft EIR/EIS for the Mission Creek Flood Control project.

Comm 32-2 First, I have been asked to advise that my clients did not receive any notice of the availability of the EIR/S. The first notice they received was the notice of the Planning Commission/Army Corps joint meeting of January 19. Because they have had inadequate time to review the EIR/S, and to engage an engineering/hydrology consultant to provide site specific information, they hereby request **an extension of the comment period** for the purpose of having an appropriate expert provide analysis specifically applicable to the reach of the creek on which their property is located.

Based on their current understanding of the project, my clients generally support the concept of a natural creek restoration, but offer the following comments, and request that additional modifications be made to the design in the reach of the creek adjacent to their property to address

Responses to the comments from:

Jana Zimmer
2640 Las Encinas Lane
Santa Barbara, CA 93105

32-1 The availability of the Report and the EIS/R was posted in the Federal Register and the State Clearing House for public review by 23 December 1999. The City also checked its mailing list for the Notice of Available required under CEQA. The notice was sent to your clients during the week of December 20-23, 1999. It was not returned to the City by the Post Office. In accordance with the applicable laws, the 45-day public review period was closed on 10 Fed 2000. Our aggressive project schedule to meet the next Water Resources Redevelopment Act (WRDA) of this year would not allow extension of the public review period.

32-2 Comment acknowledged. See responses below.

32-3 The City Municipal Code Section 28.87.038(b) allows for the replacement of nonconforming structures in cases where the loss is caused by a calamity or act of God, including flooding. While this property will be closer to the new creek bank, the property will be better protected from flooding, due to the greater capacity of the creek. Any possible changes to this section are not part of this project and speculative.

the issues raised below.

Based on estimates provided by Mr. Ed Demesa, of the ACOE, it appears that the adoption of Alternative 12 would result in taking all of the existing yard area of my clients' property to within ten (10) feet of the existing structure to accommodate creek widening to 63 feet, with a 'vertical wall-riprap slope. [3-27] The site specific impacts of this aspect of Alternative 12 have not been sufficiently analyzed, with respect to several important issue areas.

Comm 32-3

1. *Failure to analyze indirect and long term socio-economic impacts.* The document contains some information relating to the costs of direct acquisition of certain properties along the creek. The document does not address the indirect, long term impact of taking a portion of my clients' property, and re-defining or relocating the top of bank to render my clients' structure nonconforming as to creek setbacks. If my clients' property becomes non-conforming as to creek setbacks as a result of this action, it may be immediately devalued. More importantly, in the event of a future flood or other disaster which causes substantial damage to the structure, my clients may be prohibited from rebuilding. This would result in the direct loss of nine affordable rental units in the City on my clients' property alone. It would appear that the loss of these units, and other similarly situated units would be inconsistent with the goals and policies of the Housing Element to attempt to preserve the existing affordable housing stock in the city.

We note that the City staff has suggested changes to the project to embellish landscape, esthetics, cultural resources, and to save commercial structures. However, the project as designed poses a long term threat to the viability of my clients' nine unit apartment building, which has not been included in the inventory of property to be taken or damaged[1] by this action. There is no proposal to replace the housing units that will foreseeably be lost in the future, nor is there any analysis of other properties where the existing structures will be rendered nonconforming as to creek setbacks.

Moreover, the statement that the City will relocate the affected families or businesses [12.5] is unrealistic and inadequate, both as a matter of substantive compliance with Housing Element Policy 3.5, and in the real world.. The relocation assistance provisions of state law are inadequate because the payments are insufficient to establish tenants in a new unit in the current housing market, and, except for the Coastal Zone, there is no requirement that replacement units be created. The mitigation measure does not address the loss of rental units at all. The statement that the City will 'work' with the Housing Authority to relocate low income tenants is illusory. There are insufficient units for existing low income persons on the Housing Authority's waiting lists. In fact, my clients currently rent to one Section 8 tenant already.

Apart from providing much needed housing, the existing creek-side property provides an

[1]The City has stated its intention to condemn additional property in the lower Mission Creek area, and therefore needs to exercise extreme care in not engaging in improper pre-condemnation activities which reduce its value. Klopping v. City of Whittier.

All structures that are proposed to be partially or entirely removed are included in the EIS/EIR. The additional buildings proposed by the City to be saved include the Chapala Street, 536 Bath Street, 308 west Ortega Street and 326West De La Guerra Street. All of these buildings are residential units. Almost every parcel of that land is within the creek banks, some are not. All property owners will be compensated, at market value, for the land lost.

With or without this flood control project, residential units and other buildings and property could be lost due to flooding on Mission Creek. In either case, the tenants would have no control over this change. However, it should be noted that, with construction of the flood control project, the potential loss of property and units would be reduced compared to the existing condition.

32-4 The primary purposes of the Mason Street bridge design were two-fold: even with the partial take of the property at the north-easterly corner of Kimberly Avenue and Mason Streets, the simpler bridge design would be less expensive than the design recommended by the Corps. In addition, it allowed for bridge design that would be more consistent with the neighborhood and more aesthetically pleasing, consistent with bridge replacements proposed in the residential area north of the freeway. Access to the creek by area residents is not proposed to be changed. In addition, habitat expansion zones are proposed both up (just south of

Comm 32-4

important urban respite for the tenants of the housing, as evidenced by letters sent by the tenants under separate cover. The City has requested an alternative design for the Mason Street bridge, because that is an area frequented by tourists, and wants to enhance a creek-side experience for tourists It is important to consider the existing creek side experience of the neighborhood residents as well, and the document as drafted fails to do that. The EIS/EIR fails to acknowledge the environmental justice impact [12.3.1] which will occur if the City remains preoccupied with the enjoyment of tourists, while ignoring the impacts to quality of life of existing low and moderate income residents. We suggest that the existing private open space at the property provides an important local recreational resource, and that its elimination should be reconsidered, because, as the EIR/S acknowledges, at 14-7, there is such a small amount of neighborhood parkland and useable open space available to the residents.

Comm 32-5

The EIR/EIS also fails to consider that the existing land provides an important security against flood damage to the structure. Once the creek bank is relocated, the structure will be only ten feet from top of bank. There is no guarantee that flood waters will not reach and damage the structure, since the program is only designed to address a 20 year flood, and, as we all know, we have had at least two, 100 year floods in the last five years.

Comm 32-6

2. *Failure to analyze loss of mature trees, habitat and canopy which cools the creek.* The area to be taken from my clients' property includes numerous mature trees which provide habitat and shade for the creek. Again, as Commissioner Mahan requested, the EIR needs to provide an inventory of major trees, including large sycamores, to determine which trees and types of trees and vegetation the City deems most important to preserve. In the case of my clients' property, it appears that a decision was made to save a large sycamore directly across the creek. However, that tree has already been severely undermined at its roots, and is currently in danger of falling across the creek and onto my clients' property. Furthermore, the removal of mature trees on my clients' property would conflict with Visual Resources Policies and Implementation Strategies described at p. 4-10 of the EIR/EIS

Comm 32-7

3. *Inadequate description and mitigation of construction impacts, including PM10 emissions, noise, and neighborhood traffic impacts.* A two to four year construction schedule cannot reasonably be dismissed as a 'temporary' impact. The impacts of noise[2], dust and traffic during two years on the neighborhood should be reclassified to significant and unavoidable, even with mitigation. In addition, the statement that the proposed project is consistent with air quality goals does not take into account that the County remains in noncompliance for PM10 emissions. As to traffic, the report admits that the project would impact a major commuter route on Haley Street, and force street closures, as well as increase emergency response time, and that some residents will not have direct access to their residences. In light of these impacts, there is no rational basis to conclude that traffic impacts from this project will not remain significant after mitigation, and

[2]There appears to be an inconsistency in the conclusions with respect to 'short term noise' At section 9.4 the statement is made that residual noise impacts are not significant, while at p. 22-1 short term noise is identified unavoidable.

Castillo Street) and down (at Bath and Ortega Streets) stream of this property. Both of these sites, especially at Bath and Ortega Streets, have the potential for inclusion of a recreational component. No such recreational or park space exists in the West Downtown area. These and other such zones will improve recreational opportunities in this low/moderate income area while improving healthy and safety by improving flood controls. These both contribute to environmental justice improvements.

32-5 Most of the existing bank protection along the creek is deemed structurally inadequate based on their failure and erosion experienced during substantial storm events and in some cases, even during smaller events. The improvements to the creek would replace the existing sides with structurally adequate bank protection that would prevent future erosion and bank failures. The increase in flood protection provided by the wider creek would eliminate damages sustained from the more frequent flooding events and would incrementally reduce potential damages from larger and less frequent flooding events.

32-6 See response to comment 34-6.

32-7 As described in Sections 9 and 18 of the EIS/EIR, the project would be constructed in phases to minimize impacts to noise, air quality and traffic. Short-term noise impacts are unavoidable. They are also considered to be adverse, but not significant. The assessment in the EIS/EIR is deemed adequate

the decision makers have a duty to disclose that fact to the residents.

Comm 32-8

4. *Inadequate mitigation for bank failure.* The safety section of the EIR/S fails to evaluate, in particular with respect to reaches where there are ongoing erosion problems, whether the design will in fact ameliorate current conditions on a site specific basis, and fails to provide for mitigation should the design exacerbate existing problems. There should be a mitigation included which guarantees that the City will remediate and/or restore any areas which are further eroded after project completion, at its sole expense.

Comm 32-9

5. *Failure to consider the alternative of the removal of solid concrete vertical wall above the De La Guerra Street bridge, or of taking land to widen the channel from the opposite side of the creek.* It is our understanding that the currently existing eroded condition of the creek bank at my clients' property was caused and/or deteriorated because of the City's approval of a solid concrete wall above the De La Guerra street bridge. Furthermore, my clients have already lost a portion of the bank because of the County's failure to maintain and existing retaining wall. Now, the City proposes to take[3] a portion of my clients' property to compensate for the damage already done by that wall, and to widen the creek to slow the flow of water at my clients' property.

The City should consider removing the source of the problem rather than taking another owner's property to compensate for the damage done by its inappropriate approval of the existing encroachment into the creek. At a minimum, additional site specific analysis of flows and velocity attributable to the existing concrete wall, and their impact on the current state of the bank adjacent to my clients' property needs to be performed to determine whether the design of a riprap side slope would in fact improve the current situation.

In addition, the City has not considered the alternative of taking some or all of the land necessary for creek widening from the opposite bank, where the structures are located much farther away from the creek, and possibly would not be rendered nonconforming as is the case for my clients' structure.

Comm 32-10

If, after analysis of all the alternatives, the City continues to support a plan which would take my clients property in a manner or to an extent which renders the existing structure nonconforming as a result of the widening of the creek and/or relocation of the creek bank, under CEQA the City must adopt feasible mitigation measures to lessen the impacts of the project. The EIR/EIS states at p. 4-12 that "it may be necessary to reconsider the purpose of the 25-foot setback from the creek as required by the City Zoning Ordinance, and suggests that the focus should be expanded to include habitat protection and buffer considerations. We suggest a mitigation measure, to make it clear that increased buffer areas shall apply to new development only, as follows:

---

[3]It is our understanding that neither the City nor the FCD have a current legal right to enter or alter the portion of my clients' property beyond the existing top of bank, and would have to acquire that right through negotiation or condemnation.

for the purpose of this document. Neither the City nor the County consider short-term noise, air quality or traffic impacts significant, except in the case of certain very large manufacturing, energy or pipeline projects.

32-8 See response to comment 23-6.

32-9 See responses to comments 34-1 and 34-2.

32-10 This mitigation measure is unnecessary. See response to comment 32-3.

	"Where creek widening or removal of vertical walls results in a change in location of the top of bank of Mission Creek, notwithstanding any other provision of the City ordinance, the minimum setback from the creek for purposes of approval of additions, alterations to or reconstruction of existing buildings destroyed or damaged by natural disaster shall continue to be measured from the top of bank as existing on Jan. 1, 2000, and as depicted on Penfield and Smith Sheet 13 of the Mission Creek EIR/S. The City shall initiate any ordinance amendments necessary to assure that this mitigation measure shall be implemented." Thank you for your consideration of these comments. Very Truly Yours, Jana Zimmer	

Comm 33-1

RECEIVED
FEB 11 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

(1 of 5)
L. LUNDY, KATE Mo.
PO # 91628
SB, Ca 93190
(805) 969-2302

Comments:
Draft EIR/EIS
Mission Crk Flood Control Proj

Thanks for allowing me to turn in another "Comments."
Hope you can read this one.
Essentially I support a modified #10. Turn to page 5 where I list the modifications.
You all have made a wonderful effort to make a better project – it's difficult, I know, to balance so many competing interests.
Let us "MANTRA" be ... "educate, continue, not give up, Riley, etc, & cooperate." We all can learn.

Thanks again for your efforts
Sincerely,

PS: Once again, A) Turn to #2 etc
B) jump to pp 4-5
my comments

Responses to the comments from:

Kate Lundy
PO Box 91628
SB, CA 93190

33-1 Comment acknowledged.

33-2 See response to comment 16-1 and 12-3. The Corps could also participate in a comprehensive watershed management study provided that a local sponsor would be interested and willing to cost-share this study. This type of approach would address the changes in the entire watershed and would not be limited to the lower Mission Creek, as this study, which is focused primarily to increase flood protection while maximizing the environmental benefits of the creek improvements for approximately the last mile of the creek.

33-3 The City is currently in the process of undertaking a watershed wide comprehensive planning called "Creek Strategic Planning," which would try to address issues regarding all the water courses in the area. Public participation and educational program could be an important element of this planning effort. Your participation in this program is highly encouraged.

33-4 The entire creek bottom of the project reach except for the section between HWY 101 and the Chapala Street Bridge would remain natural and, in some places where hardened

(1 of 5)

LUNDY, KATE Ms.
Home PO#91628
SB, Ca 90190-1628

Comments: Draft Report & EIR/EIS
Napa Missouri & Central Project
10 Feb 2000

I. General

- I applaud your efforts (& commend that) to attempt to achieve an environmentally sound project in "Option #12," but I think you can do more...

Comm 33-2

- Floods can't/shouldn't be "CONTROLLED" by R. water's way of moving soil & clay onto out (& know, & lines) along the Mississippi in the Quad Cities & we must to think: *Watershed Health & *Mitigation & *Ecosystem Health (endangered species)

NOT CONTROL

- It's difficult in an Urban setting, but if you/we think LONG TERM & plan for Watershed Health, & Flood Mitigation, the creek systems will be less work & more Wildlife enhancing.
- if Cranston & City should not allow "range conversion" of Non Native plants (eg Palms) on foothills, Mtns.
- should have "Eminent Domain"
- get easements in & on stream bed
- think of Creek's mouth as part of delta
- should buy up land along creek - MORE

33-5

bottom exists, it will be restored to natural.

In order to minimize impacts to adjoining properties, the use of steep bank protection is necessary. The cost of additional property acquisition especially along the lower reach or the creek would render the project economically infeasible and could prevent Federal participation. Alternatives 5 and 9, which included the use of wider and vegetated bank protection, were found to be economically infeasible.

The monitoring and maintenance of vegetation and planting is included in Sections 3 and 10 of the EIS/R. The mitigation monitoring standards and the expected survivorship of the vegetation is also described.

The expanded habitat zones or pocket parks would include some recreational features as part of the City embellishment that would also include interpretive signs.

The design of the habitat expansion zones would consider health and safety issues including garbage control.

The habitat expansion zones would be stepped and would allow inundation during higher flows.

The strip of land below the Funke property would be turned into a habitat expansion zone and would include some form of interpretive signs as part of the City embellishment. Most of the creek bank on the Funke property is

MVK Draft EIR/EIS
(cont)

I. Gen:
- Have an ongoing education program w/ kids & their families (to all school districts, neighborhoods)
- gen/pvc need to foster a sense of "ownership."

II. Specific: (the still planned)
"Option D" needs MODIFICATION
- There should be no concrete stream bedding
- (Probably) Gunite vertical walls - all bank work needs camouflaging w/ native plantings
- re Maintenance:
  - all noxious grasses & invading species removed - by hand preferable (cruise Plant Society can advise)
  - Maintenance plan must be available to Monitors used
  - Continue to use restoration experts for advice - not all can learn.
- Enhancement areas, picnic tables, parks good idea if:
  - stay "natural", native look
  - interpretation
  - if lit, lighting designed not to bother homeowners etc - hire a ground w/ doc & safety
  - remove bins & trash cans - more

Comm 33-3

Comm 33-4

is either landscaped with non-natives or blanketed with giant reed (Arundo), an invasive non-native species. Due to the widening of the creek part of the parking lot would be removed.

33-6 See also responses to comment 1-4 and 38-4

(3 of 5) Lundy

Draft KR/KIS
mark

II Specifics

Comm 33-5

- Do not widen Creek
  - stay the banks of the Fork in natural area
  - it will catch the inevitable lawn flood damage (the City is doing this in the middle of allowing areas to flood)
  - fish & other creek critters need shady areas
  - one exception that can be thus provided is the Funk (or) Property on Kimberly where the 100 block of Chapala. The airport Sepulveda moves are growing from the West, to Chapala side, into the Creek. It does enhance the Funk property - including the (polluting) parking lot, so you can have an outdoor area, shady spot, Fork area. You need to preserve the non natural grades, ~~[illegible]~~ take out the parking lot (or make it a gravel) (* the Stan White building is being used as home. So if you change the zoning & allow folks to live in it you will see it will need more parking space!)
  That parking lot might make a spot for a Creek info center.

Comm 33-6

- Do not start work on project or better yet, give final approval until you also study the effects of trying it in the mouth of the Creek — it doesn't make sense — ~~[illegible]~~ to do them separately.

- MORE -

(4/1/5) Lundy
Mark Draft EIR/EIS

III. Summation

Think of the (whole) Mission Crk Watershed & plan for flood MITIGATION, not CONTROL.

- get easements along creekside (private - acquire)
- use native plants, large & small in park areas & in creek. remove non-native
- use "parks" as overflow areas
- do not widen creek (- step banks where can (parks)
- do not pave any of bottom; break it up where it's now cemented
- use guidance of restoration experts for maintenance - make maintenance plan available to public / review use minimize use handwork when possible (Caltrans Street etc), be willing, be flexible
- remove in median Funk / asphalt put king lot where as park, info / education center
- plan a solution - hire consultant bus w/ dist to protect natural areas / parks
- trash & recycle / bins
- education programs
- put in this project in bank & plan 4 creek mouth project - work it as whole project -
- control upstream sediment / erosion flow (not "RANGE CONVERSION")
- think of plan & match of occupation

- more -

(5 of 5) Lundy*
mtg. EIR/EIS

II. SUMMATION:

- It's all be open & flexible. Those who advocate the health of the creek are NOT chanting a "MANTRA" (you in the City who will hold expression know who you are)
- we all want a vibrant ecosystem. A healthy creek with riparian areas it will be less costly & better for the community
- FLOODING is part of life. Let's acknowledge it.

- Have ongoing education. The Audubon, Wildlife Society, Audubon & other organizations have creek education programs. "Project Learning Tree," Project Wild "9 Proj. Ed" are good to the Co. Curriculum.

- Work to mitigate sediment from upper creek — Spectral upstream values — require natural flooding

Please keep me posted:

Sincerely, Pete Lundy

MAILING: PO #91688
SB 92190-1688
(909) 969-8330

RECEIVED
FEB 10 2000
CITY OF SANTA BARBARA
PLANNING DIVISION

Box 1303
Summerland, CA 93067

February 10, 2000

BY HAND DELIVERY - 630 GARDEN ST.

Jan Hubbell
Project Planner
City of Santa Barbara
Box 1990
Santa Barbara, Ca 93101

Re: Comments on Lower Mission Creek Flood Control Preliminary EIR

Dear Ms. Hubbell:

We are the owners of the Creekview Apartments at 719-723 Bath Street, which is adjacent to Mission Creek below De La Guerra Street. We would like to comment on the Draft EIR proposed at the January 19th public meeting. This letter will augment some of the issues raised by our attorney, Jana Zimmer, under separate cover.

We support the concept of a natural creek restoration vs. channelization and we would certainly like the threat of flooding to be lessened. We experienced the 1995 flood in which water and silt overspilled the creek bank at this location and flooded to a depth of three feet in our garages and invaded 60 feet into our property. However we feel strongly that the current Alternative 12 plan puts our property in jeopardy rather than making it safer.

Following are issues and questions we would like to have addressed:

Comm 34-1

1. Both the retaining wall for the condominiums just above the De La Guerra Street bridge (which narrowed the creek and changed the curve of the bank) and the water from the trapezoidal Cal Trans channelization by the freeway have resulted in increased erosion downstream on our block. Since both these structures are being kept in place for Alternative 12, why can't we have a more straight sided wall to protect our property? Since there are many other areas, for example by the Ortega Street Bridge, that will be allowed high vertical "mock" sandstone walls, why not here?

2. We have the following additional concerns for the safety of our tenants, our building and our investment:

Comm 34-2

3. Ten feet from the top of the creek bank is 22 feet closer to the edge for our tenants, most of whom lived in this building during the 1995 and 1998 floods. They endured the massive clean up and (unlike the frogs) survived the reconstruction of the upstream sandbag wall by County Flood Control. Since the general "overbank" flow during a flood is downhill, why are you moving the creek even further in that direction and closer to their residential living space?

Responses to the comments from:

Teddy Gasser and Carlin Moyer
Creekview Apartments
719 Bath Street
Santa Barbara, CA

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciates your comments vital to the success of this flood control project.

The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area a higher level of flood protection and improve the riparian community along the creek.

34-1 Generally, the toe wall and vegetated sideslope bank protection would be applied in areas where structures would not have to be removed. Otherwise, vertical wall would be applied. In a few cases because of the required creek widening, the structure would have to be removed whether the vertical wall or the sideslope bank is used.

The vertical wall upstream of the De la Guerra Street Bridge is deemed to be structurally sound and would be kept in place. The design of the bank protection has taken into consideration the flow regime across the De la Guerra Street Bridge. The streambed armoring would protect from the erosive forces of the stormflows and the larger rocks would act as energy dissipaters to slow down the flow across this reach. The design of the new bank protection has taken into account the expected changes in the

Comm 34-3

4. When we have a 100 year event, there will be no buffer of land to slow the roiling waters from washing directly against our building and scouring and undercutting its foundations and walls. Can we have an assurance from the Army Corps and the City that if there is subsidence that affects our building that they assume responsibility for repairs?

Comm 34-4

5. If we are forced to sell the City our land, will repairing or rebuilding within the 25 foot setback be permitted in the event of destruction by flooding, earthquake, fire or other natural disaster in the future? Will we be given building variances by the various agencies: City, County Flood Control, Fish and Game, and any others whom we might not currently know about who might have a say at that time in the future? We can sorely afford to walk away from this investment, but we will not be able to hold onto it if we lose any of the apartments, and are unable to rebuild.

Comm 34-5

6. Our understanding is that the proposed plan takes most of the land necessary for widening the creek from only one side, removing all the land and vegetation up to within 10-15 feet of our building. We strongly suggest less widening on our side of the creek. The neighbors on our side of the creek concur with this.

Comm 34-6

7. We were told that one reason for taking most of the land from only one side of the creek is that the City wishes to save the sycamore growing in the present creek embankment opposite our property. While the tree is attractive, it was heavily undermined during the 1995 and 1998 flooding, almost to the point of toppling across the creek onto our apartment balconies. It may not survive another flood, since it is growing directly in the creek bottom. How will you be able to build your footing around this tree? We have 2 mature sycamores growing within 20 feet of our building as well as a mature black acacia and 2 mature zapote trees, several of which will be endangered or lost if you take land to within 10-15 feet of our building. The loss of these trees would certainly affect the cool and shady habitat now being enjoyed by mallards, egrets, frogs and fish, as well as the occupants of the four apartments whose balconies overlook the creek.

Comm 34-7

8. In consulting with a local civil engineer, we understand that it is usual for the Army Corps to do 25, 50 and 100 year studies of storm levels. For our section of Mission Creek, what is the freeboard and overbank for a 25, for a 50, for a 100 year storm with the current design?

Comm 34-8

9. What is the impact with a different bank design such as: 1) a higher wall? or 2) a stepped bank but further from our buildings?

Comm 34-9

10. For comparison purposes what is the overbank and freeboard for the current creek? Is a computer model available so we can view how these different degrees of flooding would affect the creek in our block?

Comm 34-10

11. We would like to have a minimum of 25 feet in back of our building. Can the Army Corps work with us so that we can save more space in back? Can the alignment be tweaked so that there is some flexibility in the final design for our reach of the creek?

streambed, as well as the forces that they would be subject to. The depth of the wall footing would prevent its undermining and the sizes of the riprap, both on the banks and on the streambed, would be designed to withstand the expected energy of the stormflows.

34-2 The widening of the creek, which is necessary in order to carry larger stormwater flows, results in impacts to practically everyone along the creek, some greater than others. Alternative 12 finds the balance between increasing flood protection and restoring the riparian corridor. Throughout the plan formulation process, additional care was taken to minimize impacts to properties and structures. Whenever feasible, alternative designs were used to avoid removal of structures. However, in some cases, alternatives could not be found.

34-3 The bank protection would be structurally adequate to carry the design capacity and withstand the energy of storm water flows. The increased capacity of the creek would greatly diminish the more frequent flooding events in the future. Consequently, flooding events higher than the design 3400 cfs design capacity would be incrementally reduced.

34-4 See response to comment 32-3.

34-5 See response to Comment 34-2.

34-6 The City's preferred creek alignment along this reach took into account the impacts to the skyline trees found in this area.

Comm 34-11

12. When can we see the proposed cross section plans for the bank at our property: 1) at each property line, and 2) at the closest point to our building?

Comm 34-12

13. Will special measures be taken to key in the upper elements of rip rap so that they do not scour out and roll into the creek during the faster flows of a 50 or 100 year flood event?

Comm 34-13

14. At the January 19 hearing, Ed Demesa was asked by Commissioner Hauser what would happen in the event of water scouring and eroding behind the proposed concrete retaining wall. It is impossible to ascertain Mr. Demesa's answer as there is no sound on that portion of the video. Could an audio transcript of his answer be included in the record?

Comm 34-14

As the owners of 719-723 Bath Street, we have always tried to maintain our property, and we wholeheartedly support Santa Barbara and the Army Corps for trying to improve this area and make it green and harmonious, a joy and inspiration for years and generations to come. We have always been willing to make certain sacrifices in order that our City and this creek project would be the best it could be, but now we are being asked to imperil our property and our livelihood. Leave us some land, please!

Sincerely,

Teddy Gasser & Carlin Moyer

Teddy Gasser and Carlin Moyer

Attachment: Letter from Charles Kline, Registered Civil Engineer

Comm 34-15

P.S. We have recently conferred with Mr. Kline, and asked him to analyze how Alternative 12 will affect our property. Because the extent of our potential land loss and resultant property endangerment was not disclosed to us prior to the January 19th City Planning Meeting (23 days after the comment period for the draft EIR began), we have not had adequate time to obtain expert assistance to address the issues of hydraulics and flood control.

Comm 34-16

Furthermore, since we have not been able to obtain a profile of our cross section of the creek with accurate measurements, we cannot comment on it prior to Feb. 10th. In view of these facts we respectfully request an extension of time beyond Feb. 10th to further address the issue of hydrology as it will affect our reach of Mission Creek under Alternative 12.

cc: Pat Kelley, City of Santa Barbara
Karl Treiburg, County Flood Control
Colonel John Carroll, Army Corps of Engineers
Ed Demesa, Army Corps of Engineers
Ms. Rose, County Supervisor, 2nd District
S. B. Rental Property Owners Association

These trees would be protected with appropriate size riprap to prevent undermining during large events. Discussions with the City arborist indicate that apparent undermining of the sycamore tree across the creek is not real. Sycamore trees have both visible surface roots and deep tap roots. The deep tap roots hold sycamore trees in place even when surface roots are disturbed. The vegetation and planting that would replace whatever is removed would eventually provide the shading that now exists.

34-7 The channel has been designed to carry 3400 cfs of stormwater flows, which is equivalent to the discharge of approximately a 20-year event. The inundation maps found at the end of the Main Report illustrate the residual flooding from events larger than the project design.

34-8 The other alternatives that were developed in this study investigated the use of vertical walls and the step walls. Both bank schemes would result in a narrower creek top width. However, the riparian corridor would be considerably less than that of the toe wall-riprap sideslope, and would be non-existent if the vertical wall is applied.

34-9 See response to comment 34-7.

34-10 See response to comment 34-6. During final design, refinements coordinated with the City and County to further minimize right-of-way impacts would be considered.

34-11 During the next phase of the project design, a more accurate mapping of the area will be developed and used in the final design. The creek's cross section and other details of the final design would be made available for public review.

		34-12 See response to comment 34-3. 34-13 The riparap would be the appropriate sizes as to prevent undermining. 34-14 Comment acknowledged. See response 34-10. 34-15 The report was officially opened for public review on December 23, 1999 and in accordance with the applicable laws, the 45-day review period was closed on 10 Fed 2000. 34-16 See response 34-11.

CHARLES I. KLINE
Registered Civil Engineer
2875 Quail Valley Road
Solvang, CA 93463

RECEIVE
FEB 10 2000
CITY OF SANTA BARBA
PLANNING DIVISION

February 10, 2000

Jan Hubbell
Project Planner
City of Santa Barbara
630 Garden Street
Santa Barbara, CA 93101

Re: Lower Mission Creek Flood Control Preliminary EIS/EIR -

Dear Ms. Hubbell:

My clients are Teddy Gasser and Carlin Moyer, owners of a nine unit apartment building at 719 Bath Street, along the stretch of Mission Creek between Ortega and De La Guerra Streets.

Due to time constraints and the inconsistent data given in the ACDE design manual, this letter is limited to preliminary comments to be entered into the record by today's deadline.

Comm 35-1 While channel alignments for permanent facilities should, whenever possible, be centered in the natural channel, good design practices sometimes preclude this option. This, however, is not one of those cases. The design agency has chosen to shift the proposed channel alignment (between Sta 53+00 and Sta 56+37) northeasterly to encroach into the existing bank. This location is very punitive to those property owners in the middle of the block of Bath Street, between Ortega Street and De La Guerra Street. This encroachment is avoidable and should be revoked. If the 1.5:1 slope at the top is required for channel capacity, that could easily be accommodated by extending the wall higher or increasing the width slightly.

Comm 35-2 No comments were noted regarding the final destination of the topsoil covering this rip-rap, when it is carried away by the higher frequency storms. Does it end up on the channel invert or on the beach? Was this topsoil considered as a bed load or a bulking factor in the hydraulic calculations? In addition, when this scour occurs, whose responsibility will it be to replace this cover and how will these slopes be accessed? Future maintenance accessibility of these slopes should be of major concern at this time to the responsible agency as well as the impacted adjacent property owners.

Comm 35-3 The Technical Appendices make reference to placing large rocks occasionally on the invert to break up the high velocities, no mention was made of any actual invert stabilization even though some velocities exceed 10 fps.

Responses to the comments from:

Charles Kline, P.E.
2875 Quail Valley Rd
Solvang, CA 93463

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciate your comments vital to the success of this flood control project.

The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area a higher level of flood protection and improve the riparian community along the creek.

35-1 See comments 34-1 and 35-4.

35-2 Since the topsoil would consist of fine material, it would be considered as wash load. This wash load would be carried to the ocean. It will be the local sponsor's responsibility to replace the cover and provide access.

35-3 For the final design, energy dissipation structures or deepening of the retaining walls and bridge structures will be considered at locations of high velocity and scour potential.

35-4 The existing capacity of the Bath Street Bridge is approximately 2000 to 2700 cfs. Since the bridge is fairly new, the local sponsor requested that we explore measures to keep the bridge. By removing downstream constrictions and improving the bridge approach and exit, the capacity of the bridge

	Page 2 Jan Hubbell - February 10, 2000 Lower Mission Creek Flood Control Preliminary EIS/EIR 719 Bath Street, Santa Barbara, CA	bridge could be increased to 3400 cfs (design flow). The bridge would be under pressure during the design flow. However, the flow would not escape outside the banks.
Comm 35-4	No engineering justification was evident in the T.A. July 1999 for reduction in channel width at Bath Street, nor the maintenance of this small capacity bridge (2000 cfs) within a 3400 cfs drainage system. (This has the appearance of a hydraulic gaffe). Under these conditions, the bridge is under pressure and also acts as a weir to distribute flood overflows onto adjacent streets and properties.	35-5 As shown in the Technical Appendices, river stationing and stations used in the H & H modeling are different.
Comm 35-5	Finally, much of the data within the T.A. July 1999 is very difficult to understand and collate due to the inconsistency in stationing. There appears to be more than one basis of stationing, which severely handicaps one in following these reports. Very truly yours, Charles I. Kline CHARLES I. KLINE	

February 10, 2000

RECEIVED

FEB 10 2000

CITY OF SANTA BARBARA
PLANNING DIVISION

Jan Hubbell
Project Planner
City of Santa Barbara
P. O. Box 1990
Santa Barbara, CA 93101

Re: Lower Mission Creek Flood Control Preliminary EIR

Dear Ms. Hubbell:

Comm 36-1

Thank you for the opportunity to comment on the Army Corps of Engineer's proposed plan to control flooding on lower Mission Creek. I reside at the Creekview Apartments located at 719 Bath Street. My apartment unit is in the rear of the property facing Mission Creek. Currently, my apartment is 29 feet from the cobblestone wall that forms the eastern bank of the creek. I am concerned about the proposed alignment of the creek, which would place it less than 15 feet of my apartment building's footing and within 10 feet from the edge of my balcony.

First, I would like to make the point that the property between the creek and my apartment building is a treasured resource, enjoyed by all who live here, as well as family and friends. We maintain a community garden in the area and we enjoy many afternoons gathered around the barbecues and picnic tables. It really is quite a unique and valued piece of land that would be mostly lost if the flood control project proceeds as currently proposed.

I am concerned that the planned alignment, diagrammed as Alternative 12 in the report, will leave my building perilously close to the creek's edge. The current flood prevention measures are based on a 20-year event. If a 100-year flood occurs, which is likely to occur considering today's uncertain climate patterns, we will be left with a very small margin of safety between our building and the rushing waters. The 10 to 15 foot buffer zone that will remain under the current plan, is about half the city's standard setback of 25 feet. If your project is completed, the buildings on the other side of the creek will be set back about 2 to 3 times as far as we will be. This seems unfair. Couldn't there be a more equal partition, especially since they are on the inside bank of the creek, where much less erosion occurs?

If the embankment should fail on my side of the creek, which is where high velocity waters come out of the cement channel above Castillo Street, we will have no protection. Conceivably, the footing of our building could be undermined in a larger-than-20-year storm. Is it possible to redesign the channel away from our apartment building to afford us some more protection and save of our valuable backyard?

Responses to the comments from:

Marty Landsfeld
Marty@PlanEarthSci.com
719 Bath Street
SB, CA 93101

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciates your comments vital to the success of this flood control project.

The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area a higher level of flood protection and improve the riparian community along the creek.

36-1 See responses to comments 34-1, 34-2, and 34-5.

Comm 36-2	A review of the existing plan reveals that the new channel will not follow the existing meanders of the creek bed. Instead, the proposed design "cuts the corner" of a natural stream turn, taking valuable land from our side of the creek, destroying our neighbors garage and leaving the other side relatively untouched. There is a large sycamore tree directly across the creek from our building, which I realize is a valuable natural asset. However, I wonder if my building is being put in jeopardy for this tree?	36-2	See response to comment 34-5.
	If you look from the Canon Perdido Street bridge, you will see that the tree is leaning heavily in the direction of my apartment. If both my building and the tree can be saved, I would like to suggest that some reinforcement be provided for the tree so that it will not be eroded from its precarious position on the bank and fall onto my balcony. Is this possible?	36-3	During the next phase of the study, a more accurate map would be developed and used for the final design. During this time additional design refinements would be considered to further optimize flood conveyance and ecological benefits.
Comm 36-3	The proposal calls for a 63 foot wide channel, which includes a 10.5 foot wide sloped bank on either side of the channel leaving a 40 foot wide channel bed. The current channel bottom width is less than 30 feet in this stretch. The depth of the channel is now approximately 12 feet deep. The ACOE plan calls for the removal of 1 to 4 more feet from the creek bed. This means we could have a 13 to 16 foot deep channel at this point. If, for example, the average channel depth were 12 feet, then a width of 50 feet at the top with a 27 foot creek bed would produce the same cross-sectional area as the proposed design. I would like to propose that the channel be narrowed, possibly via the stepped wall alternative discussed on p. 4 of Appendix C, and routed more in line with its current course to provide a safer environment for the existing buildings. Additionally, this would reduce the amount of land needed to be acquired, and may reduce the overall cost of the project.	36-4	See response to comment 8-12. Additionally, as part of the creek maintenance a meandering pilot channel that would provide the benefits you suggested would be scoured on the streambed following the creek maintenance activities.
Comm 36-4	A 40 foot wide channel leaves the stream flow highly exposed to solar radiation. The warmer water will create an inhospitable environment for fish and the potential for algae blooms which can grow into fecal coliform bacteria. A narrower creek with steeper banks would provide a greater opportunity to place riparian vegetation near the creek bed, providing essential shade for the creek, reducing thermal pollution and increasing the acceptability of the habitat for fish and other wildlife. In addition, a meandering creek provides a greater variety of microhabitats that promote higher diversity in the community of organisms from algae and invertebrates to amphibians and mammals. Meanders will also increase the variety of current speeds, deposition patterns and substrate depths reducing scouring which destroys habitat in high flow conditions.	36-5	The State Street Bridge with a 3400 cfs capacity, was included as a project constraint based on the request from the City. The City has indicated that the economic impacts of the closure and activities to replace this bridge would create a long lasting economic hardship especially since it was recently replaced. The plans formulated were designed according to the capacity of the State Street Bridge and the Bath Street bridge, also with a capacity of 3400 cfs.
Comm 36-5	As is suggested by the title of this report, this is first and foremost a flood control project. Yet, the current design has an estimated 42% chance of flooding downtown neighborhoods every 10 years. It has about the same odds of overflowing in a 25-year flood (which came an average of every 5 years last century). I understand that the constraining factor for the project is the State St. bridge which can only convey 3210 cfs. The preliminary study concluded that this bridge could not be temporarily closed for replacement due to the negative impact on the local economy and the tourist industry. There are easy detours around that bridge, one block on either side of it. I can't imagine		

Comm 36-6	that these detours would have that much of an economic impact during replacement. Was this considered in the preliminary assessments? What I would like to review is a listing of the conveyance capacities for all the bridges involved in this part of the creek. From looking at the data, it appears that the bridges are the major constraint on the prevention of flooding in the reach. Could I get a table listing the conveyance capacities of all the bridges in the study area? I am concerned about this because the project is only rated to carry a 20-year event, 50% of the time! It seems that the current design is geared towards making the inter-bridge segments of the creek into small water catches that delay the flow while water surges through the narrow bridge gaps. As can be seen from Table 5 in Appendix A, the Muskingum "X" (or an approximation of channel storing capacity) is increased nearly fivefold after channel modification. The same design only improves the Muskingum "K" (or roughly, the velocity of the passing flood wave) value by 25%. In other words, this design improves water holding capacity but does very little to improve flow-through which is what matters most in large events. Am I correct in assuming that this low velocity of the passing flood wave is due to the bridge constrictions? If so, wouldn't it be advisable to spend the money improving the bridge conveyance capacities rather than constructing small catch-basins between them? Sincerely, Martin Landsfeld Creekview Apartments resident Cc: Pat Kelley, City of Santa Barbara Karl Treiburg, County Flood Control Colonel John Carroll, Army Corps of Engineers Ed Demesa, Army Corps of Engineers Wanda Michalenko, Urban Creeks Council	See Table 2, Sub-Appendix 1 of Appendix B, Hydraulics. Note that the table is for existing conditions and does not reflect improvements in downstream constrictions. When the constrictions downstream are removed, the conveyance capacity of the upstream bridges usually improves. Also note that the channel capacities shown are bank-full flows for existing conditions, and may not correspond to pressure flow conditions. The model results reflect a number of additional processes including pressure flow at most of the bridges at peak discharge, and the influence of upstream capacity limits on flows at downstream bridges. 36-6 The design is to improve the bridge conveyance capacities, not constructing small catch-basins between them (in-line detention basins).

February 10, 2000

Jan Hubbell
Project Planner
City of Santa Barbara
P.O. Box 1990
Santa Barbara, CA 93101

Re: Lower Mission Creek Flood Control Project, comments for EIR/EIS

Dear Ms. Hubbell:

Thanks for hearing my concerns about the EIR/EIS proposed by the Corps and the City.

There are major concerns with the following:

Comm 37-1

Upstream at the beginning of the project below the Canon Perdido Street bridge, the flood stage waters appear to be moving with great volume and speed as they wash into the existing retaining wall (which you plan to leave in place) listed on Sheet 13. The wave action as it hits this wall ricochets across and glances off the bridge abutment which bounces back to the opposite bank below the bridge. This is where you plan to begin the Alternative 12 rip-rap walls.

At the beginning of the project which can be seen on Sheet 13, the property at 316-319 De La Guerra Street, which was developed in the 1980's, a segmented pre-fab cement wall was installed that changed the course of the creek. According to old time residents, the wall has taken land that was former creekbed and the flow was moved towards the Castillo Street side of the creekbank. If one stands on Castillo Street near the downstream side of the Canon Perdido/Castillo Street bridge and looks downstream towards the De La Guerra Street bridge, it appears that the developer has added land to his parcel and caused a change in the flow and wave action of the creek during peak water levels. The results are obvious. As one stands here by the cement wall and chain link fence, one can see at one's feet the white shale fill that has replaced the washout of soil and rock which was beginning to undermine Castillo Street during recent high water levels. The wave actions created in this area between these two bridges and beyond can only be seen during high water levels. Your plans to place a boulder field in this area may slow the current but will it not cause eddies that can undermine the proposed rip-rap wall on the downstream side of De La Guerra bridge, the side towards Bath Street? What will happen if the boulders wash downstream and dam up the narrow bridge openings? Would not a smooth flow of water cause less damage?

Responses to the comments from:

J. D. Dale
3 East De la Guerra Street
Santa Barbara, CA 93101

37-1 The vertical wall upstream of the De la Guerra Street Bridge is deemed to be structurally sound and would be kept in place. The design of the bank protection has taken into consideration the flow regime across the De la Guerra Street Bridge. The streambed armoring would protect from the erosive forces of the stormflows and the larger rocks would act as energy dissipaters to slow down the flow across this reach. The design of the new bank protection has taken into account the expected changes in the streambed and as well as the forces that they would be subject to. The depth of the wall footing would prevent its undermining and the sizes of the riprap, both on the banks and on the streambed, would be designed to withstand the expected energy of the stormflows.

In the last storm of February 1998. The wave actions eroded deeply into the bank causing a building to be undermined and caused the collapse of the protective wall. It seems obvious to those of us who have watched these floods in action that a major washout will occur in this area if the rip-rap wall alternative is chosen for this side of the creek, until the wave action dissipates downstream.

Alternative 12 in this area will easily fail in a high water situation.

Sincerely,

J. D. Dale

J.D. Dale
3 East De La Guerra St.
Santa Barbara, CA 93101

cc: Pat Kelly, City of Santa Barbara
Karl Treiburg, County Flood Control
Ed Demesa, Army Corps of Engineers

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CHARLES W. WILLEY
A PROFESSIONAL CORPORATION
ALBERT W. WILLEY

RETIRED
WILLIAM A. BRACE
J. JAMES HOLLISTER III

February 9, 2000

File #5347.001

Mr. Ed. Demesa
Study Manager, Plan Formulation Branch
U.S. ARMY CORP OF ENGINEERS
P.O. Box 532711
Los Angeles, CA 90053-2325

Re: Lower Mission Creek Flood Control Feasibility Study
Santa Barbara, California

Dear Mr. Demesa:

We represent Jacques Ptrs., owner of an eight (8) acre parcel improved with a 210,000 square foot industrial building located at 1 North Calle Cesar Chavez, Santa Barbara, California. Our client's property is located in the Laguna Drainage Area which is directly impacted by flooding from lower Mission Creek. In fact, our client's building was flooded to a depth of 4 feet twice in 1995. According to the City's expert, Mr. James Stubchair, the majority of the 1995 flooding was attributable to overflows from Mission Creek into the Laguna Drainage Area.

The purpose of this letter is to offer comments on the Lower Mission Creek Flood Control Feasibility Study and the proposed flood control improvements to Mission Creek.

Jacques Ptrs. appreciates all the effort that was made in preparing the Study and supports flood control improvements to Mission Creek wholeheartedly. However, Jacques Ptrs. was very disappointed that the scope of this study failed to include alternatives providing greater flood control protection. The group of alternatives studied will only

5347.001Vercall\Demesa0209.Ltr.wk7

Responses to the comments from:

Hollister and Brace, Attorneys at Law
For Jacques Partners
1126 Santa Barbara Street
Santa Barbara, Ca 93101
805-963-6711

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciates your comments vital to the success of this flood control project.

The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area a higher level of flood protection and improve the riparian community along the creek.

38-1 Several study objectives as well as constraints were developed and identified early in the feasibility phase to help guide the formulation of alternative plans. Most notably, at the request of the City, three bridges (Cabrillo, State, and Bath) were identified as project constraints with minimal modification allowed. The conveyance capacity of State Street Bridge established (with minimal improvements) at 3400 cfs, essentially sets the maximum conveyance design that the study team considered in this feasibility study. It is important to note that 3400 cfs was established assuming the creek bottom remains natural (as opposed to concrete lined). Maintaining the creek bottom natural is an

provide a fifteen (15) year and twenty (20) year level of protection. Yet, the flood histories set forth in the Feasibility Study at pages 17 through 27 shows that the City has experienced many floods since 1900 in the Mission Creek area. Many of these floods appear to have exceeded the twenty (20) year event level.

The Feasibility Study indicates that the preferred alternative would increase the capacity of Mission Creek to about a twenty (20) year level. This would only provide a twenty-seven percent (27%) benefit to the Laguna Drainage Area. Given the significant impacts the Mission Creek floods have on the Laguna Drainage Area, the 27% improvement in the Laguna Drainage Area from the proposed project is completely inadequate.

In view of the foregoing, Jacques Ptrs. makes the following comments on the proposed Feasibility Study:

Comm 38-1

1. The Feasibility Study must consider an additional alternative of extending the existing capacity of Mission Creek as it presently exists immediately above the project area by using a concrete box culvert, either in an open or closed configuration, or both, or some other design with increased capacity. We are informed that the existing capacity of Mission Creek immediately above the project area is 7,000 cfs (100-year storm level of protection). An alternative that improves the channel to a level closer to the capacity (7,000 cfs) of the adjoining section of Mission Creek needs to be included.

   The existing Study fails to adequately set forth the potential adverse environmental impacts on residences, retail and commercial buildings, transportation facilities, etc., from the failure to provide greater flood protection than the 20-year level proposed. The complete lack of a study of an alternative providing greater protection makes the Feasibility Study incomplete.

Comm 38-2

2. In lieu of the alternative suggested in the preceding paragraph, the Feasibility Study should evaluate constructing an alternative channel to carry excess flood waters generated by a greater than 20-year storm event. This alternative can take the form of buried storm drains that would carry excess flood waters from the upper end of the project area to the ocean.

an effort to avoid potential impacts to endangered species in area as well as to meet local Sponsor's design criteria. It was also determined during review of alternatives by the Mission Creek consensus group, that the cost of land acquisition and construction for a 100-year flood control project would likely exceed the benefits substantially.

38-2 During the Reconnaissance phase of this study, a proposal to divert part of the stormwater flows upstream was eliminated from further consideration since it was found to cost more and the excavation required along the streets could result in significant cultural resource impacts. In addition, it would result in the creek mouth being 500 to 1000 feet closer to the harbor mouth, resulting in greater siltation impacts to the Harbor. Earlier attempts by the Corps to build a diversion structure were met with strong opposition, would have increased costs and, at the request of the City and County, the idea was abandoned.

38-3 Because of capacity constraints above the 7000 cfs channel, flood flows breakout and this trapezoidal channel section is never filled to capacity. This study shows that the 3400 cfs design would result in reduction of flooding from higher but infrequent events. The effects of flooding from higher flows are shown on the inundation maps found near the end of the

Comm 38-3

3. The Feasibility Study should address the impact of the existing capacity of the Mission Creek Flood Control Channel immediately above the project area on the proposed alternatives, particularly preferred Alternative 12. If the capacity of Mission Creek immediately above the project area is 7,000 cfs and the maximum capacity of Mission Creek in the project area under Alternative 12 is 3,400 cfs, what happens in the event of a storm event creating a cfs flow greater than 3,400? For example, if a storm event occurs that creates of a flow of 5,000 cfs in the upper portion of Mission Creek, what happens to the 1,600 cfs excess over the carrying capacity of lower Mission Creek? Does it flood the neighborhoods all along lower Mission Creek? Does it go into the downtown retail area? Does it impact the Laguna Drainage Area and to what extent? And if these impacts exist, what mitigation measures can be adopted to prevent these impacts? The Feasibility Study fails to address all of these issues and is therefore incomplete.

Comm 38-4

4. The Feasibility Study covers a project area that ends at the upper side of the Cabrillo Street bridge. The Study did not include the Cabrillo Street bridge nor the area below the bridge where Mission Creek discharges into the ocean. It would seem that in order for the projected carrying capacity of the lower Mission Creek study area to be realized, the Cabrillo Street bridge and the area below the bridge would need to have at all times the capacity of at least 3,400 cfs.

The Feasibility Study should address the impact of the Cabrillo Street bridge and the discharge area on the proposed project. It should identify what needs to be done in terms of design, construction and maintenance with the Cabrillo Street bridge and the discharge area in order for the projected flood control capacity of the improvements to be realized. It should identify the maintenance and operation of Mission Creek below the project area that is required in order to avoid adverse impacts on the proposed project. Without this information, the study is incomplete.

main report. The map shows the reduction in flooding for the 50, 100, and 500-year floods.

38-4 As stated earlier, the Bridge with the lowest conveyance capacity identified as constraint is the State Street Bridge. Cabrillo Boulevard Bridge would convey approximately 3700 cfs; hence changes to this bridge are not warranted unless the more constricted State Street Bridge is modified or replaced. The presence of the Endangered Species in the lagoon limits the activities affecting this area. Based on information gathered from the Santa Barbara Waterfront Department and observation by the County Flood Control Staff, the sand plug is not seasonal, and is active year-round. The sand plug usually gets washed out during flows greater than typical low flows from Mission Creek. This was evident during the February 1998 flood event where the sand plug was washed away and did not have any impact on conveyance near the mouth of the creek. Instead, constrictions at the Railroad area forced the storm water to overflow and eventually flood the downstream areas.

It is respectfully requested that a supplement to the proposed Feasibility Study be issued addressing each of the foregoing issues. Only when each of these have been adequately evaluated and reported can the decision makers have the information required under the environmental laws to make an informed decision.

Very truly yours,

HOLLISTER & BRACE,
A Professional Corporation

By _____
John S. Poucher

JSP/mp

cc: Jacques Ptrs.
Pat Kelly
City of Santa Barbara

Francisco Zambelli
Property Owner 715 Bath Street
Santa Barbara, CA 93101

City of Santa Barbara
Pat Kelly, Diane Gabriel, Jan Hubbell
630 Garden Street
Santa Barbara, CA 93101

RE: Lower Mission Creek Plan

Dear Mr. Demesa,

I would like to present my concerns in regards to the plan for lower Mission Creek proposed by the Army Corp. of Engineers and the City of Santa Barbara. My concerns include the following topics of Flooding, Erosion, Expropriation and Privacy

Comm 39-1 Flooding: Why are you building a bank lower than the DeLaGuerra bridge street level? Properties along DeLaGuerra and Ortega are much lower than the rest of the nearby neighbors, and this section should be built with a high bank to prevent flooding. Every winter we are in fear of being flooded, and with such a low bank the probability of flooding seems high. I am also wondering why you are rebuilding the other bridges and not DeLaGuerra bridge? I have noticed over the years that this bridge seems to low for the water to adequately flow underneath it.

Comm 39-2 Erosion: Between DeLaGuerra bridge and Ortega bridge the force of the stream is very powerful. This needs to be taken into consideration, and a a very solid, high bank built to withstand years and years of erosion. You have proposed to take land away from my property putting me right next to the creek, so it will be especially important to me to have a high bank to take the pounding of the stream.

Comm 39-3 Expropriation: You are proposing to take my retaining wall and four garages. (built 70 years ago without problems) How are you going to replace this well built retaining wall and four garages? Why not just keep the same width of the creek and save money? Why are you taking land from Bath St. property owners and not from Castillo St. property owners who have no buildings on their side to lose? Why also, are you not removing the vertical retaining wall before the DeLaGuerra bridge? If you are saving it, why not save the rest of the verticals, the stone cement bags, and my wall all the way to Ortega bridge to protect the land and property?

Comm 39-4 Privacy: I am not in favor of having a right of way for people in back of my property by the edge of the creek. We don't need and more vegetation in this section (between DeLaGuerra and Ortega) and I highly value my privacy. Besides why not save the tax payers some money?

I have owned my property for many years and am very familiar with all of the issues with the creek. Please take my questions and concerns into consideration. Thank you for your time.

Sincerely,

Francisco Zambelli

Francisco Zambelli — 2/9/2000

Responses to the comments from:

Francisco Zambelli
715 Bath Street
Santa Barbara, CA 93101

The Corps of Engineers, the Santa Barbara County Flood Control District, and the City of Santa Barbara appreciates your comments vital to the success of this flood control project.

The proposed project as designed has been formulated with the cooperation of the County and the City and represents a balance to provide the residents of this area a higher level of flood protection and improve the riparian community along the creek.

39-1 Flooding. The cross sectional area of the creek required to convey the maximum design flow (3400 cfs, as established considering the project constraints) requires widening the creek while generally using the existing grade as the new top of bank. Depending on the type of bank scheme used, the new creek topwidth would range from 60-70 feet. Across the subject property, banks will be protected using the combination toe wall and vegetated riprap slope, which would require a 63-feet top width.

Together with the creek improvements both upstream and downstream, the existing De la Guerra Street Bridge with minor modifications will be able to convey the 3400-cfs design capacity.

39-2 Erosion. The design of the bank protection structure has taken into consideration the forces that it will have to withstand. The depth of the footing is designed so that potential changes in the creekbed will not

			undermine the integrity of the structure. Also, the gradation of the riprap has been sized to withstand the energy of the stormwater flows as well as prevent erosion behind the toe walls. Because the capacity of the creek will be greater than it is now, damage to your property is expected to be reduced.
		39-3	Expropriation. The widening of the creek necessary in order to carry larger stormwater flows results in property impacts to practically everyone along the creek, some greater than others. Alternative 12 finds the balance between increasing flood protection and restoring the riparian corridor. Throughout the plan formulation process, additional care was taken to minimize impacts to properties and structures. Whenever feasible, alternative designs were used to avoid removal of structures. However, in some cases, alternatives could not be found. Also, see response to comment 37-1.
		39-4	Privacy. County Flood Control has indicated that access to the creek will not change from the existing conditions in this area. Discussion of providing pedestrian access in the area between State and Yanonali Streets is still ongoing.

APPENDIX - L

MAILING LIST
FINAL EIS/EIR
LOWER MISSION CREEK FLOOD CONTROL PROJECT
SANTA BARBARA, CALIFORNIA

PREPARED BY

U.S. ARMY CORPS OF ENGINEERS
LOS ANGELES DISTRICT

SEPTEMBER 2000

APPENDIX L - MAILING LIST
FINAL EIS/EIR
LOWER MISSION CREEK FLOOD CONTROL PROJECT

Distribution of the Final Environmental Impact Statement/Environmental Impact Report .

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APPENDIX 4

Combined Coastal Development Permit and Consistency Certification and Mission Creek Concurrence Letter

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FAX (415) 904-5400

Th 9 d&e

Click here to go to the staff report addendum posted on April 7, 2009.

Coastal Development Permit No.:	**4-08-096**
Date Filed:	1/17/2009
49th Day:	3/7/2009
180th Day:	7/16/2009
Consistency Certification No.:	**CC-012-09**
Date Filed:	3/2/2009
3 Months:	6/2/2009
6 Months:	9/2/2009
Staff:	M. Delaplaine

STAFF REPORT: REGULAR CALENDAR
COMBINED COASTAL DEVELOPMENT PERMIT APPLICATION AND CONSISTENCY CERTIFICATION

CDP APPLICATION NO. 4-08-096 **CONSISTENCY CERTIFICATION:** CC-012-09

APPLICANT: **City of Santa Barbara, Dept. of Public Works (with Santa Barbara County as a Co-applicant)**

AGENTS: Thomas Conti and Michael Berman, City of Santa Barbara, and Tom Fayram, Santa Barbara County

PROJECT DESCRIPTION: Construction of Lower Mission Creek Flood-Control Project (Exhibits 3-4)

PROJECT LOCATION: Lower Mission Creek, City of Santa Barbara (Exhibits 1-2)

MOTION & RESOLUTION: **Page 5**

Substantive File Documents: See Appendix B, p. 32

SUMMARY OF STAFF RECOMMENDATION:

The staff is recommending **APPROVAL**, with **Seven (7) Conditions,** and **CONCURRENCE,** as so conditioned, with a combined coastal development permit ("CDP") application and consistency certification submitted by the City of Santa Barbara ("City")[1] for implementation of the Mission Creek Flood Control Project, to improve flood protection on Lower Mission Creek in the City of Santa Barbara. The Commission has previously reviewed and found this project consistent with the Coastal Act in several iterations: first and primarily as a federal consistency matter, but also in part as a CDP

[1] Note: Santa Barbara County has agreed to be a co-applicant, as it is the County which performs maintenance of the creek channel. However, most references to the applicant in this report will be to the "City" of Santa Barbara.

matter. The purpose of this CDP and consistency certification is to transfer the responsibilities for implementation of the project from the federal government to the local government (i.e., from the U.S. Army Corps of Engineers ("Corps") to the City). [2]

The two actions (consistency and CDP review) are needed because the project is located both within and inland of the coastal zone, and because the Commission does not have an administrative procedure for converting a Commission concurrence with a federal agency's Consistency Determination into a concurrence with a Consistency Certification authorizing a local agency to conduct the work. During its previous reviews the Commission understood that the City would eventually be the primary implementing agency. Accordingly, since the Corps has ceased funding the project, to formalize the Commission's review of the City's role, the City has submitted the subject CDP application and consistency certification for its assumption of implementation for the project. The City has also, as it has consistently (albeit, informally) to date, agreed to comply with all previous requirements the Commission has adopted as necessary for the project.

The Commission's previous reviews commenced with the Corps' submittal of "phased" consistency determinations (No. CD-117-99 and CD-046-06 – see the footnote on page 13 for an explanation of the "phased" consistency review process). In those reviews the Commission adopted conditions, which the Corps agreed to implement. Those conditions are being carried through to the subject CDP/consistency certification, and the City has also agreed to comply with them. These conditions address the need to continue to: (a) clarify the terms of the Tidewater Goby Management Plan; (b) clarify future review procedures and monitoring responsibilities for the project as a whole; (c) memorialize agreements to avoid artificial lagoon breaching; and (d) provide an appropriate lagoon buffer zone.

In separate but integrally related CDP matters: (1) the Commission has also approved (with conditions) City implementation of portions of the project, in connection with a CDP for the Cabrillo Bridge replacement (CDP 4-07-134); and (2) the City has approved a coastal development permit (that was not appealed) for the portion of the project within its coastal development permitting jurisdiction (i.e., from Chapala St. to Highway 101)(City CDP2008-00012). Both of these actions included mitigation and monitoring measures (Exhibits 5-6) that are being incorporated into the subject submittals and the Commission's conditions.

The subject CDP and consistency certification also reflect several relatively minor modifications and refinements to the project since the Commission's previous federal consistency review, consisting primarily of:

---

[2] Aside from those components associated with the Cabrillo Blvd. Bridge replacement, which the Commission has already authorized the City to implement, in CDP 4-07-134.

1) replacing the originally-proposed "fish ribs" with "grout lines" on the sides of the channel (both "fish ribs" and "grout lines" are the spaces designed to provide refuge for tidewater gobies during high stream velocity conditions);

2) vegetating the south side of the lagoon;

3) relocating the oxbow bypass (near Hwy. 101 and the Union Pacific rail corridor) 10 ft. closer to the Moreton fig tree; and

4) refining the Ortega Street Bridge Replacement (located outside the coastal zone) to alter the channel alignment slightly and retain a residence that was originally slated for removal.

The Commission has already endorsed the first of these changes through its approval with conditions of the City's CDP application for the Cabrillo Bridge replacement (CDP 4-07-134). The second and fourth of these changes are improvements from a habitat perspective, and which the Commission staff will have the continuing opportunity to review when they are finalized. The third change appears benign, and the City's request includes an analysis showing that this relocation of the oxbow slightly to the east will not affect the Moreton fig tree (and includes additional monitoring commitments to assure protection of the tree). None of these changes alters the fundamental consistency of the project (as conditioned) with the Coastal Act. In its most recent consistency review (CD-046-06), the Commission found that:

> *… the original flood control project was necessary for flood-control purposes, was the least damaging feasible alternative, included feasible mitigation and, with the mitigation and proposed design, would, as conditioned, protect stream resources, water quality, and environmentally sensitive habitat (including federally listed threatened species - steelhead trout and tidewater goby), scenic views, and archaeological resources.*
>
> *…*
>
> *Five conditions are necessary to assure consistency with Sections 30236, 30231, 30233, 30240, and 30251 of the Coastal Act, due to the need to: a) avoid misunderstandings over the terms of the Tidewater Goby Management Plan (because several differing drafts had been circulated prior to the Commission's scheduled public hearing); b) clarify future review procedures and monitoring responsibilities; c) memorialize agreements between the Corps, the Commission staff, and the City over avoiding lagoon breaching, planning and implementing an appropriate lagoon buffer zone based on the applicable Coastal Act policies (and including coordination with interested parties); and d) clarify creekside riparian monitoring responsibilities. With the measures included in the revised design,*

> *monitoring, maintenance, mitigation, and adaptive management plans, and the on-going review of water quality plans and maintenance dredging, as well as any future project modifications, and as conditioned, the project would protect stream resources, water quality, environmentally sensitive habitat (including steelhead trout and tidewater goby), scenic views, and would therefore be consistent with Sections 30236, 30231, 30233, 30240, and 30251 of the Coastal Act.*

These findings remain applicable, and the minor modifications contained in the current proposal are also consistent with the same Coastal Act policies. Conditions are still needed to transfer management responsibilities from the Corps to the City. Accordingly, the Special Conditions on this permit are similar to those the Commission previously adopted for the Corps and City Cabrillo Bridge projects, with two additional conditions to: (1) reflect the mitigation and monitoring requirements from the more recent City and National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) Biological Opinions (Exhibits 6-7), and (2) require a liability waiver. The standard of review for the portion of the project subject to a coastal development permit is the Chapter 3 policies of the Coastal Act, with the City's certified local coastal program serving as guidance. The standard of review for the portion of the project subject to consistency review is also Chapter 3 of the Coastal Act. As conditioned, the project is consistent with the Stream Alteration, Water Quality, Wetlands, ESHA, View Protection, and Hazards Policies (Sections 30236, 30231, 30233, 30240, 30251, and 30253) of the Coastal Act.

LIST OF EXHIBITS

Exhibit 1. **Project Area (with 1a showing Coastal Zone and CCC Original Permit Jurisdiction)**
Exhibit 2. **Project Plans**
Exhibit 3. **Detailed Project Plans**
Exhibit 4. **Ortega St. Bridge Replacement**
Exhibit 5. **CCC Conditions, Cabrillo Bridge Replacement, CDP 4-07-134**
Exhibit 6. **City Conditions, CDP-2008-00012**
Exhibit 7. **NMFS 7 USFWS Conditions, Cabrillo Bridge Replacement, Biological Opinions 2007-08982 and 1-8-07-F-63**
Exhibit 8. **CCC Findings, Corps of Engineers, CD-046-06**
Exhibit 9. **Original Project Description, from Corps CD-117-99**

I. STAFF RECOMMENDATION

MOTION AND RESOLUTION FOR COASTAL DEVELOPMENT PERMIT

The staff recommends that the Commission make the following motion and adopt the following resolution to APPROVE the permit application with special conditions.

MOTION

I move that the Commission **approve** Coastal Development Permit Application No. 4-08-096 subject to the conditions set forth in the staff recommendation.

The staff recommends a **YES** vote on the foregoing motion. Passage of this motion will result in conditional approval of the permit and adoption of the following resolution and findings. The motion passes only by affirmative vote of a majority of the Commissioners present.

Resolution:

The Commission hereby **approves** coastal development permit 4-08-096 and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act. Approval of the permit complies with the California Environmental Quality Act because either: 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment; or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

MOTION AND RESOLUTION FOR CONSISTENCY CERTIFICATION

MOTION

I move that the Commission **conditionally concur** with the City of Santa Barbara's consistency certification CC-012-09 that, if modified in accordance with the following conditions, the project described therein would be consistent with the enforceable policies of the California Coastal Management Program (CCMP) and would be conducted in a manner consistent with that program.

The staff recommends a **YES** vote on the motion. Passage of this motion will result in a concurrence in the certification, as conditioned, and adoption of the following resolution

and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

Resolution:

The Commission hereby **conditionally concurs** with the consistency certification by the City of Santa Barbara on the grounds that, if modified in accordance with the following condition, the project described therein would be consistent with the enforceable policies of the CCMP and would be conducted in a manner consistent with that program.

II. STANDARD CONDITIONS

See Appendix A, p. 32.

III. SPECIAL CONDITIONS

1. Tidewater Goby Management Plan and other Lagoon Management Plans. The Management Actions and other commitments contained in the Tidewater Goby Management Plan – Lower Mission Creek Flood Control Project, dated April 2005, shall be binding on the City of Santa Barbara, except as provided below. Any changes to the management plan or other actions inconsistent with the Management Actions in the Tidewater Goby Management Plan shall not be implemented unless the Coastal Commission has authorized any such changes or actions through the federal consistency and/or coastal development permit review process (i.e., as an amendment to this cdp and/or a modification to this consistency certification). Any future management plans or projects involving the Mission Creek Lagoon or, to the extent the Laguna Channel is addressed in the Tidewater Goby Management Plan, involving the Laguna Channel estuary, shall be coordinated with the Tidewater Goby Management Plan.

2. Lagoon Breaching Prohibition. The City (and County) shall not breach the lagoon, unless there is an imminent threat to public health and safety, and, in that event, only after the Executive Director: (a) agrees with the City's (or County's) determination that there is an imminent threat to public health and safety, reviews; (b) has determined that all feasible measures have been incorporated to minimize threats to tidewater gobies; and (c) has authorized any such breaching.

3. Lagoon Buffer. In conjunction with the Tidewater Goby Management Plan, the City shall establish a 20-50 foot wide buffer zone along both sides of the creek/lagoon that extends 150-200 feet downstream of the ends of the existing wing walls at the downstream side of the Cabrillo Boulevard bridge. This buffer plan shall include clarification as to its effects and relationship to the existing bike path and periodic

development such as dredging operations within this area. Prior to commencement of construction of the flood control project the City shall submit the final Tidewater Goby and Lagoon Management Plans (including buffers) to the Executive Director for his review and approval based on his determination that they continue to remain consistent with standards articulated in the draft Plans the Commission previously found consistent with the Coastal Act (in CD-046-06), and with the Commission's findings in that action. The Executive Director will only consider activities which are consistent with the Coastal Act and will involve all known interested parties prior to approving the final plan.

4. <u>Landscaping Requirements Adjacent to Mission Creek.</u> Prior to commencement of construction of any portion of the flood control project, the City will provide, for the review and approval of the Executive Director, a detailed monitoring plan for the native landscaping to be provided outside the creek bank edges. The detailed plan shall specify performance and success criteria and what incentives are being provided to encourage private landowners to plant and maintain native, non-invasive, trees and shrubs, and shall provide for use of local stock wherever possible. The plan shall comply with all the measures contained in Special Conditions 13 and 14 of CDP 4-07-134, which include:

Habitat Enhancement and Revegetation Monitoring Program

A. *Prior to the issuance of the coastal development permit, the City shall submit, for the review and approval of the Executive Director, a final Habitat Restoration, Enhancement, Monitoring, and Management Program for restoration of the creek banks upstream and downstream of the Cabrillo Bridge. This program shall be prepared by a qualified biologist or environmental resource specialist and shall include, but not be limited to, the following:*

   1. *Onsite habitat enhancement shall include, at a minimum, the removal of any and all invasive plant species on the site and revegetation of all disturbed areas with appropriate native species of local genetic stock, including areas where invasive and non-native plants were removed;*
   2. *Indication as to the location, type, and height of any temporary fencing that will be used for restoration. The plans shall also indicate when this fencing is to be removed.*
   3. *Indication on plans that invasive plant species shall be removed from all development and restoration areas for the life of the project.*
   4. *Indication on plans that herbicides shall not be used within the creek habitat. Target non-native or invasive species shall be removed by hand.*
   5. *Indication on plans that rodenticides containing any anticoagulant compounds (including, but not limited to, Warfarin, Brodifacoum, Bromadiolone or Diphacinone) shall not be used.*

6. *A baseline assessment, including photographs, of the current physical and ecological condition of the proposed restoration site, including, a biological survey, a description and map showing the area and distribution of existing vegetation types, and a map showing the distribution and abundance of any sensitive species.*
7. *A description of the goals of the restoration plan, including, as appropriate, topography, hydrology, vegetation types, sensitive species, and wildlife usage.*
8. *Documentation of performance standards, which provide a mechanism for making adjustments to the mitigation site when it is determined, through monitoring, or other means that the restoration techniques are not working.*
9. *Documentation of the necessary management and maintenance requirements, and provisions for timely remediation should the need arise.*
10. *A planting palette (seed mix and container plants), planting design, source of plant material, and plant installation. The planting palette shall be made up exclusively of native plants that are appropriate to the habitat and region and that are grown from seeds or vegetative materials obtained from local natural habitats so as to protect the genetic makeup of natural populations. Horticultural varieties shall not be used. Plantings shall be maintained in good growing condition throughout the life of the project and, whenever necessary, shall be replaced with new plant materials to ensure continued compliance with the revegetation requirements. No plant species listed as problematic and/or invasive by the California Native Plant Society, the California Exotic Pest Plant Council, or by the State of California shall be employed or allowed to naturalize or persist on the site. No plant species listed as a 'noxious weed' by the State of California or the U.S. Federal Government shall be utilized or maintained within the property.*
11. *Sufficient technical detail on the restoration design including, at a minimum, a planting program including a description of planned site preparation, method and location of exotic species removal, timing of planting, plant locations and elevations on the baseline map, and maintenance timing and techniques.*
12. *A plan for documenting and reporting the physical and biological "as built" condition of the site within 30 days of completion of the initial restoration activities. The report shall describe the field implementation of the approved restoration program in narrative and photographs, and report any problems in the implementation and their resolution.*
13. *Documentation that the project will continue to function as viable native habitats, as applicable, over the long term.*

14. *A Monitoring Program to monitor the Restoration and Enhancement. Said monitoring program shall set forth the guidelines, criteria and performance standards by which the success of the enhancement and restoration shall be determined. The monitoring programs shall include but not be limited to the following:*

    (a) Interim and Final Success Criteria. Interim and final success criteria shall include, as appropriate: species diversity, total ground cover of vegetation, vegetative cover of dominant species and definition of dominants, wildlife usage, hydrology, and presence and abundance of sensitive species or other individual "target" species.

    (b) Interim Monitoring Reports. The City shall submit, for the review and approval of the Executive Director, on an annual basis, for a period of five (5) years, a written monitoring report, prepared by a monitoring resource specialist indicating the progress and relative success or failure of the enhancement on the site. This report shall also include further recommendations and requirements for additional enhancement/ restoration activities in order for the project to meet the criteria and performance standards. This report shall also include photographs taken from predesignated sites (annotated to a copy of the site plans) indicating the progress of recovery at each of the sites. Each report shall be cumulative and shall summarize all previous results. Each report shall also include a "Performance Evaluation" section where information and results from the monitoring program are used to evaluate the status of the enhancement/restoration project in relation to the interim performance standards and final success criteria.

    (c) Final Report. At the end of the five-year period, a final detailed report on the restoration shall be submitted for the review and approval of the Executive Director. If this report indicates that the enhancement/ restoration project has, in part, or in whole, been unsuccessful, based on the performance standards specified in the restoration plan, the applicant(s) shall submit within 90 days a revised or supplemental restoration program to compensate for those portions of the original program which did not meet the approved success criteria. The revised or supplemental program shall be processed as an amendment to this coastal development permit.

    (d) Monitoring Period and Mid-Course Corrections. During the five-year monitoring period, all artificial inputs (e.g., irrigation, soil amendments, plantings) shall be removed except for the purposes of providing mid-course corrections or maintenance to insure the survival of the enhancement/restoration site. If these inputs are required beyond the first two years, then the monitoring program shall be extended for every additional year that such inputs are required, so that the success and

sustainability of the enhancement/restoration is insured. The enhancement/restoration site shall not be considered successful until it is able to survive without artificial inputs.

B. The City shall undertake development in accordance with the final approved plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final plans shall occur without a Coastal Commission approved amendment to this coastal development permit or a new coastal development permit, unless the Executive Director determines that no new amendment or permit is legally required.

Herbicide Use

Herbicide use shall be restricted to the use of Glyphosate Aquamaster™ (previously Rodeo™) herbicide for the elimination of non-native and invasive vegetation located within upland and transitional areas of the project site for purposes of habitat restoration only. No use of any herbicide shall occur during the rainy season (November 1 – March 31) unless otherwise allowed by the Executive Director for good cause. In no instance shall herbicide application occur if wind speeds on site are greater than 5 mph or 48 hours prior to predicted rain. In the event that rain does occur, herbicide application shall not resume again until 72 hours after rain.

The plan shall also provide for increasing the incentives for landowners in the event monitoring shows that success criteria are not being met. The City or County shall assume all monitoring responsibilities for the life of the project.

5. <u>Water Quality, Sediment Testing, Erosion Control, and Habitat Monitoring Plans.</u> Prior to commencement of construction of any portion of the flood control project, the City shall submit, for the review and approval of the Executive Director, all water quality, sediment and beach compatibility testing, erosion control, and stormwater protection plans. The plans shall comply with the measures in Conditions 7 and 8 of CDP-07-134, which require:

Protection of Water Quality

It shall be the applicant's responsibility to ensure that the following occurs during project operations:

A. *In order to minimize impacts to Mission Creek from storm water runoff associated with Cabrillo Boulevard, the City shall install filtration basket inserts within the catch basins at the Cabrillo Bridge.*

B. *The work area shall be flagged to identify limits of construction and identify natural areas that are off limits to construction traffic.*

C. *No construction materials, debris, or waste shall be stored on the beach or where it may be subject to erosion and dispersion. Construction debris and sediment shall be properly contained and secured on site with BMPs to prevent the unintended transport of sediment and other debris into coastal waters by wind, rain or tracking. Construction debris and sediment shall be removed from construction areas as necessary to prevent the accumulation of sediment and other debris that may be discharged into coastal waters. Any and all debris resulting from construction activities shall be removed from the project site within 24 hours. Debris shall be disposed at a debris disposal site outside of the coastal zone or at a location within the coastal zone authorized to receive such material.*

D. *No equipment shall be stored in the project area, including designated staging and/or stockpile areas, except during active project operations.*

E. *Only areas essential for construction shall be cleared.*

F. *Construction equipment shall not be cleaned on the beach or in the beach parking lots.*

G. *Stockpiled materials shall be located as far from stream areas on the designated site(s) as feasible and in no event shall materials be stockpiled closer than 30 ft. in distance from the top edge of a stream bank.*

H. *All debris and other construction materials shall be cleared from Mission Creek prior to reintroduction of stream flows and tidal action to the channel following removal of the cofferdams and sheet piles.*

Erosion Control Plans

Prior to commencement of development, the City shall submit two (2) sets of final erosion control plans, prepared by a qualified engineer, for review and approval by the Executive Director. The plans shall be consistent with all measures required pursuant to Special Condition Seven (7). The plans shall also incorporate the following criteria:

(1) The plan shall delineate the areas to be disturbed by grading or construction activities and shall include any temporary access roads, staging areas and stockpile areas. The natural areas on the site shall be clearly delineated on the project site with fencing or survey flags.

(2) The final erosion control plans shall specify the location and design of erosion control measures to be implemented during the rainy season (November 1 – May 1). The City shall install or construct temporary sediment basins (including debris basins, desilting basins or silt traps),

temporary drains and swales, sand bag barriers, silt fencing, stabilize any stockpiled fill with geofabric covers or other appropriate cover, install geotextiles or mats on all cut or fill slopes and close and stabilize open trenches as soon as possible. Straw bales shall not be approved. These erosion measures shall be required on the project site prior to or concurrent with the initial grading operations and maintained throughout the development process to minimize erosion and sediment from runoff waters during construction. All sediment shall be retained on-site unless removed to an appropriate approved dumping location either outside the coastal zone or to a site within the coastal zone permitted to receive fill.

(3) The plan shall also include temporary erosion control measures should grading or site preparation cease for a period of more than 30 days, including but not limited to: stabilization of all stockpiled fill, access roads, disturbed soils and cut and fill slopes with geotextiles and/or mats, sand bag barriers, silt fencing; temporary drains and swales and sediment basins. The plans shall also specify that all disturbed areas shall be seeded with native grass species and include the technical specifications for seeding the disturbed areas. These temporary erosion control measures shall be monitored and maintained until grading or construction operations resume.

(4) Storm drain inlets shall be protected from sediment-laden waters by the use of inlet protection devices such as gravel bag barriers, filter fabric fences, block and gravel filters, and excavated inlet sediment traps.

6. <u>Incorporation of Conditions From Other Permits and Entitlements, Monitoring Plans, and Annual Reporting.</u> The City shall comply with the conditions of City permit CDP-2008-00012 (Exhibit 6), and the NMFS and USFWS Biological Opinions (2007-08982 and 1-8-07-F-63, respectively) (Exhibit 7). Any changes to the project, including any modifications to any of those permit conditions, unless specifically modified in Conditions 1-5 above, shall trigger the need for the City to notify the Commission staff, and if the staff deems it necessary, an amendment to this coastal development permit and/or re-review of the consistency certification. A copy of all monitoring reports required under these conditions, including all annual monitoring plans for tidewater goby and steelhead habitat monitoring submitted to the Fish and Wildlife Service and National Marine Fisheries Service, shall be submitted to the Commission staff for its review in a timely manner once they are completed. The City shall comply with all previously-imposed seasonal restrictions, including but not limited to: (a) no work in the creek from November 1 through March 31; (2) pile driving limited to September 1 to December 1 (unless the Executive Director authorizes a one month extension); (3) work in the creek limited based on City Condition (H)(32) (see Exhibit 6, p. 14); and (4) no work in the estuary from December 1 to June 1. The City shall also provide annual reports to the Commission staff describing the status of all project

components, and its progress in implementing all of these mitigation measures (including its compliance with the Commission's conditions on CDP-4-07-134 (Cabrillo Bridge Replacement)).

7. Assumption of Risk. By acceptance of this permit, the City acknowledges and agrees (i) that the site may be subject to hazards from flooding and erosion; (ii) to assume the risks to the City and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards.

Prior to issuance of the Coastal Development Permit, the applicant shall submit a written agreement, in a form and content acceptable to the Executive Director, incorporating all of the above terms of this condition.

IV. FINDINGS AND DECLARATIONS

A. BACKGROUND

Mission Creek has flooded, often severely, at least 20 times since 1900, and the flood control project was designed to increase the channel's capacity from 1500 cubic feet per second (cfs), to 3400 cfs, and to provide an approximately 20-year storm level of protection (current capacity provides 5-year protection). In a two-part "phased" review (under the Coastal Zone Management Act),[3] the Commission concurred with consistency determinations submitted by the U.S. Army Corps of Engineers (Corps) for the lower Mission Creek Flood Control Project. On August 9, 2001, the Commission

[3] 15 CFR §930.36 (d) provides: *Phased consistency determinations.* In cases where the Federal agency has sufficient information to determine the consistency of a proposed development project or other activity from planning to completion, the Federal agency shall provide the State agency with one consistency determination for the entire activity or development project. In cases where federal decisions related to a proposed development project or other activity will be made in phases based upon developing information that was not available at the time of the original consistency determination, with each subsequent phase subject to Federal agency discretion to implement alternative decisions based upon such information *(e.g.,* planning, siting, and design decisions), a consistency determination will be required for each major decision. In cases of phased decisionmaking, Federal agencies shall ensure that the development project or other activity continues to be consistent to the maximum extent practicable with the management program.

conditionally concurred with the Corps' consistency determination for Phase I of the flood control project (CD-117-99), and on August 11, 2006, the Commission conditionally concurred with the Corps' consistency determination for Phase II (CD-046-06).

Throughout its reviews the Commission was aware that the City and/or the County of Santa Barbara would ultimately assume the responsibility for constructing and maintaining many of the project's components, and at this point, the Corps is no longer the implementing agency. Because the City needs a Corps (Section 404) permit for its work within the stream, and in order to maintain the Commission's continuing ability to enforce agreements the Commission previously had with the Corps (which the City had informally agreed to during the Commission's reviews), the Commission staff informed the City that to enable itself to legally implement the project, the City should apply for the subject coastal development permit (CDP) for the portion of the project in the Commission's original permit jurisdiction, and submit a consistency certification for the remainder of the project.

The Commission has already authorized City implementation of a portion of the flood control project, the component that was included within the City's previous CDP application for the Cabrillo Street Bridge replacement. The Commission approved that CDP with conditions on April 9, 2008 (CDP No. 4-07-134). Finally, the City has approved a coastal development permit (that was not appealed) for the portion of the project within its coastal development permitting jurisdiction (i.e., from Chapala St. to Highway 101)(City CDP2008-00012). That permit included Conditions assuring, among other things, that the City would comply with all prior Commission requirements adopted through its reviews of the Corps' consistency determinations. Additional City requirements on that City permit are incorporated in Condition 6 and attached as Exhibit 6.

B. PROJECT DESCRIPTION

The City proposes to assume responsibility for implementing the Lower Mission Creek flood-control project, which consists of: (1) increasing the channel capacity from 1500 cu. ft. per second to 3400 cubic feet per second (cfs), thereby providing an approximately a 20-year storm level of protection; (2) replacing four bridges along the study reach; (3) installing a new culvert bypassing the oxbow below Highway 101 ("oxbow bypass") (the oxbow would be left in place as a low-flow channel); (4) planting of native riparian species along sloped banks stabilized by riprap and creation of additional riparian habitat by enlarging planted slopes in areas where the Corps must purchase property adjacent to the stream; (5) reconstructing creek banks using either a vertical wall or a combination vertical wall and riprap sideslope (combination vertical wall/riprap sideslope would consist of vertical wall for the bottom half, with ungrouted riprap for the upper half, and with native riparian vegetation planted within the riprap); (6) maintaining existing natural stream bottom, and restoring concrete lined stream

bottom to natural conditions (except immediately underneath bridges and through the oxbow); (7) installing fish habitat improvements; and (8) sediment disposal (location to be determined in consultation with Commission staff and pending test results).

The project is described in greater detail on pages 4-5 of the Commission's findings on Consistency CD-046-06 (Exhibit 8) and in its finding on CD-117-99 (Project Description excerpt, Exhibit 9). The City proposes several refinements and modifications made since that Commission review, consisting of:

1) replacing the originally-proposed "fish ribs" with grout lines on the sides of the channel; (both grout lines and fish ribs are the spaces designed to provide refuge for tidewater gobies during high stream velocity conditions);
2) vegetating the south side of the lagoon; and
3) relocating the oxbow bypass (near Hwy. 101 and the Union Pacific rail corridor) 10 ft. closer to the Moreton fig tree; and
4) refining the Ortega Street Bridge Replacement (located outside the coastal zone) to alter the channel alignment slightly to accommodate the roots of Sycamore trees downstream of the bridge, and retaining a residence that was originally slated for removal.

The City's most recent plans are attached as Exhibits 2-4. Exhibit 1a shows the location of the Commission's original jurisdiction – development in this area is the portion of the project that is the subject of CDP 4-08-096; the remainder of the project is the subject of CC-012-09.

C. APPLICANT'S CONSISTENCY CERTIFICATION

The City of Santa Barbara has certified that the proposed activity complies with the federally approved California Coastal Management Program (CCMP) and will be conducted in a manner consistent with such program.

D. PROCEDURES

1. <u>Combined Procedures</u>. A coastal development permit from the Commission is needed for the portion of the project within the Commission's original permit jurisdiction (Exhibit 1a). A consistency certification is required for remainder of the project, including portions outside (landward of) the coastal zone boundary.[4] To facilitate Commission review of these items, both the coastal development permit application and the consistency certification will be heard at the same time. The

[4] Note – A Commission-issued CDP is "deemed" to satisfy any federal consistency requirements; the subject consistency certification is needed in addition to the subject CDP to cover areas outside the Commission's original (CDP) jurisdiction (including the area in the City's CDP jurisdiction, as locally issued CDP's are *not* deemed to satisfy federal consistency requirements).

Commission staff recommends approval of the coastal development permit application and concurrence with the consistency certification, both actions with the same conditions.

2. <u>Conditional Concurrences</u>. Section 15 CFR § 930.4 of the Federal Consistency regulations provides, in part, that:

(a) Federal agencies, applicants, persons and applicant agencies should cooperate with State agencies to develop conditions that, if agreed to during the State agency's consistency review period and included in a . . . Federal agency's approval under Subparts D, E, F or I of this part, would allow the State agency to concur with the Federal action. If instead a State agency issues a conditional concurrence:

(1) The State agency shall include in its concurrence letter the conditions which must be satisfied, an explanation of why the conditions are necessary to ensure consistency with specific enforceable policies of the management program, and an identification of the specific enforceable policies. The State agency's concurrence letter shall also inform the parties that if the requirements of paragraphs (a)(1) through (3) of the section are not met, then all parties shall treat the State agency's conditional concurrence letter as an objection pursuant to the applicable Subpart and notify, pursuant to §930.63(e), applicants, persons and applicant agencies of the opportunity to appeal the State agency's objection to the Secretary of Commerce within 30 days after receipt of the State agency's conditional concurrence/objection or 30 days after receiving notice from the Federal agency that the application will not be approved as amended by the State agency's conditions; and

(2) The Federal agency (for Subpart C), applicant (for Subparts D and I), person (for Subpart E) or applicant agency (for Subpart F) shall modify the applicable plan, project proposal, or application to the Federal agency pursuant to the State agency's conditions. The Federal agency, applicant, person or applicant agency shall immediately notify the State agency if the State agency's conditions are not acceptable; and

(3) The Federal agency (for Subparts D, E, F and I) shall approve the amended application (with the State agency's conditions). The Federal agency shall immediately notify the State agency and applicant or applicant agency if the Federal agency will not approve the application as amended by the State agency's conditions.

(b) If the requirements of paragraphs (a)(1) through (3) of this section are not met, then all parties shall treat the State agency's conditional concurrence as an objection pursuant to the applicable Subpart.

E. ALTERATION OF COASTAL WATERS AND SENSITIVE HABITATS

The Coastal Act provides:

> **Section 30236.** *Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (l) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) developments where the primary function is the improvement of fish and wildlife habitat.*
>
> **Section 30233**
>
> *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to [eight specified uses]: …*
>
> **Section 30240**
>
> *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
>
> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

As discussed in its findings on the two consistency determinations submitted by the Corps for this flood control project (the findings from CD-117-99 and CD-046-06), the Commission has twice found that the flood control project was an allowable use for stream alteration and fill, [5] was the least environmentally damaging feasible alternative, included adequate monitoring and mitigation, and would benefit the stream resources by widening of the

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[5] As the Commission noted in CD-117-99, while flood-control facilities are not defined as an allowable use under Section 30233(a), Section 30236 of the Coastal Act allows for alteration of streams for flood-control purposes, provided that it meets all the requirements of that section. Citing the legal principle that "Giving precedence to the more particular provisions of section 30236 over the more general provisions of sections 30233(a) and 30240(a) is in accord with generally applicable principles of California law. See, e.g., Civil Code § 3534 ('Particular expressions qualify those which are general.')" the Commission determined that Section 30236 clearly anticipates dredging, diking, and filling of coastal waters for flood-control purposes and is a more specific policy than Section 30233(a) or 30240(a) and clearly shows legislative intent to allow alteration of streams for flood-control purposes.

stream and estuary and removal of artificial hard bottom in the estuary and stream. Exhibit 8 contains the most recent set of these findings (CD-046-06), is attached as Exhibit 8, and is incorporated here by reference. In that review the Commission further found:

> *In compliance with the above commitments and Commission conditions, the Corps has convened the experts needed to analyze the biological, hydrological, water quality, and other specific design and has submitted the results of these more refined analyses, in the form of a tidewater goby management plan, a flood control channel maintenance, a refined pilot channel design, and landscaping plans.*
>
> *The pilot channel design plan is based on input from technical experts at the Corps, City, County, University of California, NOAA Fisheries, as well as input from environmental organizations (EDC and Santa Barbara Channel Keeper). The refined plan includes: (1) unlined stream bottom (except under existing bridges); (2) wider openings at four bridges; (3) widened stream sections, including (a) 2,200 ft. of widening from Canon Perdido to Haley St. (from 25 ft. to 42 ft), 1000 ft. from Haley St. to Highway 101 (25 ft. to 50 ft.), and 1,100 ft. from Yanonali St to the Beach (27 ft. to 60 ft.); (4) removal of existing concrete bottom; (5) installation of riprap lining to protect bridges from scour due to increased widths; (6) construction of a pilot channel lined with gravel/cobbles designed to concentrate flows and maintain temperatures beneficial for fish year-round; (7) placement of clusters of boulders as rock energy dissipaters; (8) installation of fish ledges and fish baffles to provide fish protection and resting areas (particularly for steelhead); (9) consideration of measures to reduce the extent of riprap; and (10) an adaptive management program …*
>
> *The … County's adaptive Channel Maintenance Plan [which was part of the Corps' submittal, noted that] … the County will be performing the maintenance activities. This plan includes inspection and adoption of methods to protect fish enhancement features of the project, minimizing effects of vegetation removal and channel desilting, minimizing use of herbicides (and continuation of the original "no use of herbicides in the coastal zone" feature), re-creating pilot channels where needed, and removal of non-native vegetation ….*
>
> *The tidewater goby management plan … discusses the result of the tidewater goby genetic … and notes the importance of Mission Creek as one of the primary regional "source" estuaries (i.e., for repopulation to other estuaries) for tidewater gobies in southern Santa Barbara County, due to its relatively large size and long history of goby occupation, larger tidal reach, and longer upstream accessibility. The management plan also notes fish habitat improvements (e.g., baffles, ledges, slower velocities along the perimeter of the lagoon) discussed above will also benefit gobies, which are poor swimmers and need refuge during high flow events. The plan notes that, as discussed above, limited construction (primarily repair of*

damaged channel walls) would occur within the estuary itself. The plan contains [adequate] measures … to protect gobies ….

…

In order to find the proposed project consistent with Sections 30236, 30231, 30233, 30240, and 30251 of the Coastal Act, the Commission finds that several conditions are necessary due to the need to: (a) avoid misunderstandings over the terms of the Tidewater Goby Management Plan (in part because several differing drafts had been circulated prior to the Commission's scheduled public hearing); (b) clarify future review procedures and monitoring responsibilities; (c) memorialize agreements between the Corps, the Commission staff, and the City over avoiding lagoon breaching, planning and implementing an appropriate lagoon buffer zone based on the applicable Coastal Act policies and including coordination with interested parties; and (d) clarify creekside riparian monitoring responsibilities.

To address these concerns, the conditions on pages 7-8 [pp. 9-10 of this report] *are intended to: (a) clarify which version of the Tidewater Goby Management Plan is the agreed-upon plan; (b) clarify that any changes to the plan will necessitate further Commission review; (c) clarify that any Laguna Channel plans are coordinated with the Tidewater Goby Management Plan; (d) clarify that artificial lagoon breaching is prohibited (except under emergencies, and even then only with Commission authorization); (e) reflect an agreement to amend the lagoon buffer provisions of the Tidewater Goby Management Plan to provide for a 20-50 ft. buffer on both sides of the lagoon; (f) provide for submittal of the final management plan (including buffers) to the Commission staff for its review and concurrence, which review will involve all known interested parties, and which will only consider activities which are consistent with the Coastal Act (including the habitat, wetland and stream alteration policies, and public access and recreation policies, and, if any conflicts should occur, the conflict resolution provisions of Section 30007.5 of the Coastal Act); (g) provide for Commission staff review of the riparian landscaping plan outside the creekbed, including plans and ongoing monitoring responsibilities; and (h) provide for Commission staff review of the water quality plans and monitoring.*

With the measures included in the revised design, monitoring, maintenance, mitigation, and adaptive management plans, and the on-going review of water quality plans and maintenance dredging, as well as any future project modifications, and as conditioned, the Commission finds the project would protect stream resources, water quality, environmentally sensitive habitat (including steelhead trout and tidewater goby), scenic views, and would therefore be consistent with Sections 30236, 30231, 30233, 30240, and 30251 of the Coastal Act.

The Commission reiterates these findings and incorporates by reference the remainder of those findings (contained in Exhibit 8). Additional support for these conclusions can be found in pp. 22-33 in the Commission's findings on CDP-4-07-134. In that action, the Commission further found:

> *Although the Mission Creek watershed is not pristine, the drainage as a whole provides habitat for important sensitive aquatic resources and qualifies as environmentally sensitive habitat area. Invertebrates collected from the estuary include epibenthic crustaceans and insects. Tidewater goby, prickly sculpin, staghorn sculpen, topsmelt, striped mulled, and partially armored stickleback have been found in the lagoon. Two federally listed endangered species occur in Mission Creek lagoon, the tidewater goby (as a year-round resident) and southern steelhead (during upstream and downstream migration periods. While southwestern pond turtles and red-legged frogs have historically occurred in Mission Creek, suitable habitat for these species is not present in the project area.*
>
> *The lagoon and its margins are used for resting and feeding by numerous species of migratory and resident birds, including waterfowl, diving and wading fishers, and shorebirds. Common species include western gull, ring-billed gull, Herman's gull, California brown pelican, pied-billed grebe, American coot, mallard, common loon, great egret, snowy egret, among others. Many other species are commonly observed using the lagoon, including great blue heron. Bird use of the lagoon varies from month to month. Spring is a season of relatively low bird diversity and abundance. In early June, seabird use of the lagoon and beach area increases. The late summer and fall migrations bring a large number of shorebird species into the Santa Barbara area that remain in the area until the spring migration in mid-March.*
>
> *Four federally or state listed threatened or endangered species of birds have historically been found in the area of Mission Creek, including the western snowy plover, California brown pelican, California least tern, and peregrine falcon. However, suitable habitat for western snowy plover does not exist in or around the project area and they are not expected to be found in the project area. Additionally, five other bird species that are state species-of-special-concern have historically been found in Mission Creek. These included California gull, long-billed curlew, double-crested cormorant, elegant tern, and black skimmer.*
>
> *...*
>
> *The project would also involve the reconstruction and restoration of portions of Mission Creek and Lagoon between State Street and the Pacific Ocean in the City of Santa Barbara. Specifically, the project involves removal of the existing wooden vertical retaining walls and ornamental vegetation upstream of the*

Cabrillo Bridge. These walls would be replaced with concrete retaining walls in the same location as the existing walls. Additionally, native riparian vegetation would be planted on either side of the creek to improve cover over the creek and aquatic habitats in the creek. Downstream of the bridge, the sack-crete retaining walls extending approximately 130 feet southeast of the bridge would be removed. The west and east banks of the creek estuary would be laid back. On both sides a rock revetment covered in a vegetated geogrid and planted with native coastal dune scrub would be placed at the top of the slopes. The newly created additional estuary and transition habitat would be planted with emergent wetlands, transitional wetlands, and riparian scrub.

In total, the [Cabrillo Bridge] project will result in the creation of approximately 9,299 square feet of new wetland and riparian areas in the project area. Additionally, there will be a net increase in open estuarine water habitat due to the change from two rows of piles to one row of piles in the estuary as a result of the bridge replacement. However, while the old piles would be removed as part of the project, the new piles will have to be driven in new locations currently providing open estuarine habitat. This constitutes fill of coastal waters according to Section 30233 of the Coastal Act. No other permanent fill of coastal waters or wetlands is proposed as part of the project.

While the project will result in a new increase in coastal wetlands and estuarine habitat, construction of the project will temporarily impact a 650-foot section of channel from just above the State Street bridge to downstream of the Cabrillo Bridge. As described in Section IV-A, the project will involve partial to full dewatering and diversion of the creek using sheet piles, cofferdams, and flumes for periods up to 9 months in duration. Installation of cofferdams for dewatering during construction would temporarily impact 0.88 acres of the emergent wetlands located upstream of the State Street Bridge. Additionally, construction activities, including pile driving, grading, dewatering, etc could lead to disruption of habitat for aquatic species such as the tidewater goby, steelhead trout and for avian species that could be present in the project area. The project would, therefore, result in the substantial alteration of Mission Creek pursuant to Section 30236 of the Coastal Act and has the potential to impact sensitive biological resources protected under Section 30240 of the Coastal Act.

Allowable Uses

As discussed above, the project will include the filling of coastal waters to install piles for the new bridge and reconstruction of the banks of Mission Creek Estuary. Section 30233 of the Coastal Act identifies seven allowable uses for the dredging diking and filling of coastal waters. According to Section 30233(a) filling of coastal waters can be allowed for, among other purposes, incidental public service and restoration purposes. The proposed project involves the

replacement of a public road and bridge that provide public access and emergency public access routes for the City of Santa Barbara. The bridge will not be expanded or widened into the creek channel and, in fact, the project would reduce the overall fill of the Mission Creek Estuary by replacing two rows of piles with one row of piles. The project would also involve the restoration of 9,299 square feet of new wetland and riparian areas in the Mission Creek Estuary as discussed above. The project, therefore, meets the definition of allowable uses for fill of coastal waters as defined by Section 30233.

The project would also involve a substantial alteration of Mission Creek, a coastal stream. Section 30236 of the Coastal Act allows for such alterations of coastal streams for flood-control purposes, provided that the alternative "incorporate[s] the best mitigation measures feasible,' that no feasible alternatives exist for protecting existing structures in the floodplain, and that such flood protection is necessary for public safety or to protect existing development. As discussed above in Section IV-B, the existing overall capacity of the Mission Creek system is 1,500 cfs and provides only a five-year level of flood protection. Accordingly, the areas surrounding lower Mission Creek have repeatedly flooded. According to studies conducted by the Army Corps of Engineers (Draft Feasibility Study, 1999), records show that the area has suffered at least 20 considerable floods since 1900. These floods have negatively impacted the health and safety of residents of Santa Barbara and damaged several existing structures along the creek. As discussed in Section IV-B, the Commission has approved the Lower Mission Creek Flood Control Project proposed by the Army Corps. This project involves the reconstruction of lower Mission Creek down to the State Street Bridge and will improve the capacity to 3,400 cfs and a 20-year level of flood protection. The subject project will further improve the hydraulic conveyance of Mission Creek through the use of two spans on the new Cabrillo Boulevard Bridge instead of the existing three spans. This would improve the flood capacity under the bridge from 3,400 cfs without any freeboard to 3,400 cfs with one foot of freeboard space from the bottom of the bridge to the water surface. Therefore, the Commission finds that the proposed project is for flood-control purposes and is necessary to protect existing development. The project, therefore, meets the "allowable uses" requirements of Section 30236.

Finally, Section 30240 prevents the Commission from approving uses within an environmentally sensitive habitat area unless the use is dependent on the sensitive resource. While the proposed project will provide restoration benefits to the Mission Creek Estuary, the new bridge and flood control facility are not "dependent" on wetland and estuarine environmentally sensitive habitat areas. However, Sections 30233 and 30236 of the Coastal Act specifically allow for fill of coastal waters and alteration of streams for incidental public services and flood-control purposes, provided that all the requirements of those sections are met. Section 30233 and 30236 are more specific policies than Section 30240 and

clearly anticipate dredging, diking, and filling of coastal waters for incidental public uses and flood-control purposes in sensitive wetland and creek habitats. They are therefore the controlling provisions when a wetland or a stream is also an ESHA. Bolsa Chica Land Trust v. Superior Court (1999), 71 Cal. App. 4th 493, 514-515. In other words, Sections 30233 and 30236 of the Coastal Act, in fact, require the Commission to approve incidental public uses and flood-control facilities in certain circumstances, even though such activities do not comply with the resource-dependent tests of 30240(a) of the Coastal Act.

Other Feasible Less Environmentally Damaging Alternatives

…

In conclusion, the Commission finds that the proposed project is the least damaging feasible alternative to provide flood control for existing structures and replace the structurally deficient Cabrillo Boulevard Bridge.

Mitigation Measures and Avoidance of Significant Disruption.

Section 30240 of the Coastal Act requires that the project avoid significant disruption to the sensitive resources. Additionally, Sections 30233 and 30236 require that where fill or alterations of coastal waters is allowed, feasible mitigation measures should be implemented to minimize adverse environmental effects. The City, in their approval of the final mitigated negative declaration for the project and a coastal development permit for the portion of the project in their jurisdiction, required several conditions and mitigation measures related to the protection of sensitive habitats, wetlands, and coastal waters (Exhibits 1 and 2). These measures including timing of construction activities to minimize disturbance to habitats, erosion control measures, revegetation, and the proposed dewatering and fish relocation measures described in previous sections. Special Conditions One (1) and Two (2) incorporate, by reference, all of the mitigation measures required in Final mitigated Negative Declaration No. MST2004-00878 and all conditions of approval contained in City Council Resolution No. 029-07 as special conditions of the subject permit. Erosion control, construction staging, and water quality measures are discussed in more detail in Section IV-D below.

Tidewater Goby, Southern Steelhead Trout, and Other Aquatic Resources

Pile driving … is proposed to occur from October 1 to December 1, in order to avoid the downstream and upstream steelhead migration periods and the spawning period for the tidewater goby. Special Condition Four (4), therefore, prohibits any pile driving activities from December 1 to October 1, unless approved by the Executive Director.

… Prior to any dewatering all fish species would be captured and relocated from the construction area. A flume 3-6 feet in width would allow the creek to flow through the dewatered work area. According to the City's biologists, URS Corporation, and Dr. Camm Swift, adequate velocities for the tidewater goby range from 1.2 feet per second (ftps) to 2 ftps. The flow velocities inside the flume during dewatering will vary from 0 to 7 ftps. The project biologist, however, would regulate flows and conditions in the flume to the extent feasible to provide for optimal flow conditions in the flume for goby. Additionally, natural sediment will be placed on the bottom of the flume and occasional cobbles to slow down flows and simulate natural conditions for any aquatic species present. …

Special Condition Four (4), therefore, requires the City to prohibit full dewatering of the creek from November 1 through March 31 and requires the City to monitor tidewater goby in order to install cofferdams prior to spawning season in May through July.

In addition to the above-mentioned measures, the City has proposed a tidewater goby and aquatic species management plan. This plan recommends measures for protection of aquatic species, including monitoring of the creek prior to construction, biologist monitoring of all in creek operations, recovery and relocation of fish species, and post-project monitoring. Special Condition Five (5) requires the City to submit, for the review and approval of the Executive Director, a final version of this plan that shall be prepared by a qualified biologist and implemented during project construction.

Commission staff notes that as part of the Lower Mission Creek Flood Control Project (See Section IV-B, Background), the Commission approved The Tidewater Goby Management Plan for Mission Creek (URS Corporation 2005). This plan outlines management measures, creek and estuary design guidelines, and construction procedures that should be implemented for any work conducted in the Mission Creek estuary. The proposed project is consistent with all of the recommended protection measures outlined in the 2005 Tidewater Goby Management Plan with two exceptions. The first exception is regarding the recommendations for the alignment of Mission Creek and Laguna Channel

lagoons. Originally, the approved Tidewater Goby Management Plan suggested that during construction in either Mission Creek or Laguna Channel, the Mission Creek and Laguna Channel lagoons should be maintained as separate in order to minimize impacts to both lagoons. However, since that time, the plan has been amended to include a recommendation that the City should try to maintain a configuration on the beach so that the two lagoons are merged. This configuration apparently provides better habitat for the tidewater goby and steelhead. The merged lagoon configuration was approved by the Commission in 2006 as part of the City's Sediment Management Plan (CDP 4-05-155). The City's biologists have determined, therefore, that if the lagoons are merged at the time of construction, maintaining this alignment would constitute the least amount of impact to the estuary. Similarly, if the lagoons are separated at the time of construction, they would be maintained as separate in order to avoid the construction activities associated with creating a new configuration.

The second exception is regarding the recommendation for the use of "ribs" as fish refugia with Mission Creek. Tidewater gobies are poor swimmers in fast moving water. During storm events, they find refuge in backwater areas where flow velocities are reduced. The Tidewater Goby Management Plan requires that design elements be incorporated within the creek to provide areas of refuge for gobies during high flow events. These design elements include 8-foot-tall "ribs" to be constructed on the concrete walls, fish ledges, and fish baffles. The City proposes to construct fish baffles along the creek bottom adjacent to the walls as part of the Cabrillo Bridge project. However, instead of constructing "ribs" as described in the Tidewater Goby Management Plan, the City is proposing to provide this refugia within the grout spaces of the faux sandstone retaining walls. This design element would include the construction of two-inch-deep vertical and horizontal grout lines within the retaining walls that would extend from the ordinary high water line to the bottom of the formed wall, for approximately 8 feet in vertical length. The horizontal grout spaces would be filled with grout for a few inches every 10 feet, which would create eddies and slower moving water behind the grout barriers. Tidewater gobies would be able to seek refuge from currents created by increased flows in the creek as a result of proposed upstream improvements associated with the Lower Mission Creek Flood Control Project. The City, in collaboration with Santa Barbara Channel Keepers and the Urban Creeks Council have determined that the revised design element would be more effective in providing fish refugia for gobies in Mission Creek than the "ribs" that were recommended in the Tidewater Goby Management Plan.

As stated above, the proposed project, with the exception of the two recommendations described above, is consistent with all of the recommended protection measures outlined in the 2005 Tidewater Goby Management Plan. The plan recommends that no more than one half of the estuary be dewatered at

> *any time. As previously noted, the proposed project would involve the dewatering of a maximum of 1/3 of the estuary at any given time. The plan also requires a 10-foot wide zone of native shrubs to be established on the top of the concrete wing walls immediately below the bike path portion of Cabrillo Bridge. The proposed project would result in the installation of the 10-foot-wide buffer of native vegetation along the wing walls of the bridge for approximately 100 to 130 feet downstream of the Cabrillo Bridge. The proposed design of the banks of the estuary within the project area is consistent with these design guidelines.*
>
> *…*
>
> *Due to the reasons discussed above, the Commission finds that the proposed project, as conditioned, is consistent with 30233, 30236, and 30240 of the Coastal Act.*

As discussed above, the Commission notes that while the City has refined and slightly modified the project as presently proposed, these changes do not alter the fundamental consistency of the project (as conditioned) with the applicable Coastal Act policies. The modifications and refinements consist of:

1) replacing the originally-proposed "fish ribs" with grout lines on the sides of the channel; (these are the spaces designed to provide refuge for tidewater gobies during high stream velocity conditions);

2) vegetating the south side of the lagoon;

3) relocating the oxbow bypass (near Hwy. 101 and the Union Pacific rail corridor) 10 ft. closer to the Moreton fig tree; and

4) refining the Ortega Street Bridge Replacement (located outside the coastal zone) to alter the channel alignment slightly to accommodate the roots of Sycamore trees downstream of the bridge, and retaining a residence that was originally slated for removal.

Concerning the first of these changes, replacing the originally-proposed "fish ribs" with grout lines on the sides of the channel, the Commission has already found it consistent with the Coastal Act in its review of the City's Cabrillo Bridge replacement (CDP 4-07-134), which are hereby incorporated by reference (and summarized above).

The second change, vegetation around the lagoon, would be an improvement from a habitat perspective, and the Commission staff will have the continuing opportunity to review the final plans before they are finalized and implemented.

Concerning the third change, relocating the oxbow bypass (near Hwy. 101 and the Union Pacific rail corridor) 10 ft. closer to the Moreton fig tree, the City has included in its submittal an analysis showing the relocation of the oxbow slightly to the east will not affect the Moreton fig tree.[6] The City's submittal includes commitments for additional monitoring to assure protection of the tree, and these are contained in Exhibit 6, are incorporated into Condition 6, and the City will provide the Commissions staff with the monitoring reports.

Concerning the fourth change, which is located outside the coastal zone, the City has refined the Ortega Street Bridge Replacement component. The bridge location and channel alignment has changed slightly to accommodate the roots of Sycamore trees downstream of the bridge, and a residence on the north side of the bridge that was originally slated for removal no longer needs to be removed. This modification will allow more landscaping to be provided on the west side of Mission Creek and Sycamore trees can be better protected. In addition, as this component is still in the review process, the Commission staff will have the opportunity to review the final designs and plans before they are finalized and implemented.

Finally, and also post-dating the Commission's previous consistency and CDP reviews, the City has included its formal consultations with the U.S. Fish and Wildlife Service and National Marine Fisheries Service (Biological Opinions 1-8-07-F-63 and 2007-08982, respectively), prepared for the Cabrillo Bridge Replacement portion of the project. The City has agreed to implement the terms and conditions of these Opinions, which are attached as Exhibit 7 and incorporated into Condition 6.

With the measures included in the revised design, monitoring, maintenance, mitigation, and adaptive management plans, and the on-going review of water quality plans and maintenance dredging, as well as any future project modifications, and as conditioned, the Commission finds the project would protect stream resources, water quality, and environmentally sensitive habitat (including steelhead trout and tidewater goby), and would therefore be consistent with the stream alteration, wetlands, and ESHA policies (Sections 30236, 30233(a), and 30240, respectively) of the Coastal Act collectively.

F. WATER QUALITY

Section 30231 of the Coastal Act provides:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground*

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[6] *Arborist Report on Impact to Moreton Bay Fig Tree*, Dan Condon Arborist Consulting, December 19, 2007

> *water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

In its previous review (CD-046-06), the Commission found:

> *The proposed flood-control facility provides the Corps with an opportunity to restore water quality resources in Mission Creek by incorporating appropriate measures or technologies into the project design to reduce non-point source pollution. The reconstruction of the flood-control facility, including the replacement of bridges, installation of a culvert under Highway 101, and construction of floodwalls, provide the Corps with an opportunity to design the facility to incorporate measures into the project in order to reduce non-point source pollution. …*
>
> *Measures to protect water quality in the original project included: (1) no vegetation removal or herbicide use in the coastal zone; (2) use of silt curtains and mosaic vegetation removal where such activities occur inland of the coastal zone boundary; (3) coordinating the construction of the flood-control facility with the water quality efforts within the City of Santa Barbara, so that, if necessary and advantageous, the City could construct measures to control appropriate non-point source pollution concurrent with the project; and (4) preparation of a storm water pollution prevention plan (SWPPP) to minimize water quality impacts from the construction of the flood-control facility, to be subject to further Commission consistency review (both the SWPPP and the maintenance plan). Final water quality plans have not been included in this second phase of the submittal; thus, the Corps will still need to provide these details for Commission review and concurrence prior to any construction. The Commission reiterates its previous water quality conclusion* [from CD-117-99] *that, with the opportunity to review the final SWPPP/water quality plans, … the project is consistent with the water quality policy (Section 30231) of the Coastal Act.*

The Commission reiterates its previous water quality conclusion that, as conditioned, with the opportunity to review the final SWPPP/water quality plans prior to construction, and water quality monitoring reports, the project contains sufficient measures to protect water quality and is consistent with the water quality policy (Section 30231) of the Coastal Act.

G. SAND SUPPLY

Section 30233(d) of the Coastal Act provides for the use of suitable material removed from coastal streams to be used for beach replenishment purposes. This section provides that:

> *Erosion control and flood control facilities constructed on water courses can impede the movement of sediment and nutrients which would otherwise be carried by storm*

> *runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for such purposes are the method of placement, time of year of placement, and sensitivity of the placement area.*

In its previous review (CD-046-06) the Commission concluded that:

> *With the commitments for phased consistency review and use of suitable material for beach replenishment purposes, the Commission finds that the proposed project is consistent with the sand supply policies of the Coastal Act." This information is still unavailable; thus, like the water quality issue discussion contained in the previous section, sediment analysis and beach replenishment options will need to be reviewed at a later phase when the information becomes available. The Commission reiterates its previous sand supply conclusion that, with the opportunity to review the final sediment test results and disposal proposals, the project is consistent with the sand supply policy (Section 30233(d)) of the Coastal Act.*

As noted above, the project includes the potential for placement of material excavated from the creek on area beaches, but only if it is clean and of a suitable grain size. Under Condition 5, the City will test, and submit test results to the Executive Director for review and approval, prior to any such disposal. The Commission reiterates its previous conclusion and finds that, as conditioned, with the opportunity to review the final sediment test results and any disposal proposals, the project is consistent with the sand supply policy (Section 30233(d)) of the Coastal Act.

H. VISUAL RESOURCES

Section 30251 of the Coastal Act provides, in part, that:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas….*

The Commission previously found (CD-046-06):

> *The Corps's submittal includes several measures providing both habitat benefits, as described above, as well as aesthetic improvements. The landscaping proposal … provides for planting, monitoring, and maintaining native riparian habitat within the creek, planting riparian habitat within Corps'- and City-controlled areas adjacent to the creek banks, providing incentives for private landowners to plant additional riparian habitat adjacent to the creek banks, monitoring the landscaping plans to*

> *assure they meet identified success criteria, removing concrete from the creek bottom (except under four bridges), and the above-discussed designs for floodwalls that, to the degree possible, mimic a natural creek bank. With the measures included in the revised design, monitoring, maintenance plans, and as conditioned, the Commission finds that the project would improve scenic public views and be consistent with the visual resource protection policy (Section 30251) of the Coastal Act.*

The Commission reiterates this conclusion and finds that, as conditioned, with the landscaping, monitoring, and continuing review provisions, the project is consistent with the visual resource protection policy (Section 30251) of the Coastal Act.

I. GEOLOGIC HAZARDS

Section 30253 of the Coastal Act states, in part:

> *New development shall:*
> *(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
> *(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

Section 30253 of the Coastal Act mandates that new development minimize risks to life and property in areas of high geologic, flood, and fire hazard. Although the proposed development is intended as a flood control project and will serve to reduce the potential for flooding of developed areas, some inherent remains for any flood control projects, and the project was not designed to accommodate all foreseeable flood events. The Coastal Act recognizes that certain types of development, such as the proposed project, may involve some risk. As such, the Commission finds that due to the unforeseen possibility of storm waves, surges, erosion, seismicity, and flooding, the applicant shall assume these risks as a condition of approval. Therefore, Special Condition Seven (7) requires the applicant to waive any claim of liability against the Commission for damage to life or property that may occur as a result of the permitted development.

Therefore, the Commission finds that the proposed project, as conditioned, is consistent with Coastal Act Section 30253.

J. CEQA

Section 13096 of the California Code of Regulations requires Commission approval of a coastal development permit application to be supported by a finding showing the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment.

The proposed project has been conditioned in order to be found consistent with the Chapter 3 policies of the Coastal Act. Mitigation measures, in the form of special conditions, require a) avoidance, protection, and improvements to sensitive habitat; b) use of suitable materials; c) limiting the activity to as to not disrupt breeding and foraging of endangered and sensitive species; d) aesthetic improvements; and e) public safety improvements. As conditioned, there are no feasible alternatives or additional feasible mitigation measures available which would substantially lessen any significant adverse effect which the activity may have on the environment. Therefore, the Commission finds that the proposed project, as conditioned to mitigate the identified impacts, is the least environmentally damaging feasible alternative and complies with the applicable requirements of the Coastal Act to conform to CEQA.

APPENDIX A: STANDARD CONDITIONS

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. Interpretation. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.

4. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittee to bind all future owners and possessors of the subject property to the terms and conditions.

APPENDIX B: SUBSTANTIVE FILE DOCUMENTS

1. City of Santa Barbara Coastal Development Permit No. CDP-2008-00012, Mission Creek Flood Control Project.

2. Coastal Commission CDP No. 4-07-134, City of Santa Barbara, Replacement of Cabrillo Bridge over Mission Creek, Santa Barbara.

3. Consistency Determination CD-046-06, Army Corps, Mission Creek Flood Control Project.

4. Consistency Determination CD-117-99, Army Corps, Mission Creek Flood Control Project.

5. Landscape Plan, Lower Mission Creek Flood Control Project, U.S. Army Corps of Engineers and City of Santa Barbara, April 2006.

6. Genetics of *Eucyclogobius newberryi* in Mission Creek Santa Barbara: a regional metapopulation analysis using mitochondrial control region sequence and microsatellites. Prepared for Army Corps of Engineers 8/19/05, D. K. Jacobs, K. D. Louie, D. A. Earl, C. Bard, C.Vila & C.C. Swift, Department of Ecology & Evolution, UCLA.

7. Santa Barbara County Streams – Lower Mission Creek, Feasibility Study Hydraulic Technical Appendix, Sedimentation Engineering, Army Corps of Engineers November 1999.

8. Final Environmental Impact Statement/Environmental Impact Report and Feasibility Study for Lower Mission Creek Flood Control Project, Santa Barbara, California, September 2000.

9. Biological Assessments, Lower Mission Creek Flood Control Project, Santa Barbara, California, December 1999.

10. Draft Fish and Wildlife Coordination Act Report, Lower Mission Creek Flood Control Project, Santa Barbara, California, U.S. Fish and Wildlife Service, September 1999.

11. Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara, County California, National Marine Fisheries Service, August 2, 2000.

12. Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara, County California, U.S. Fish and Wildlife Service, June 1, 2001.

13. U.S. Fish and Wildlife Service Biological Conference Opinion 1-8-07-F-63, Cabrillo Bridge Replacement, June 25,2008.

14. National Marine Fisheries Service (NMFS) Biological Opinion 2007-08982, Cabrillo Bridge Replacement, December 28, 2007.

15. Arborist Report on Impact to Moreton Bay Fig Tree, Dan Condon Arborist Consulting, December 19, 2007.

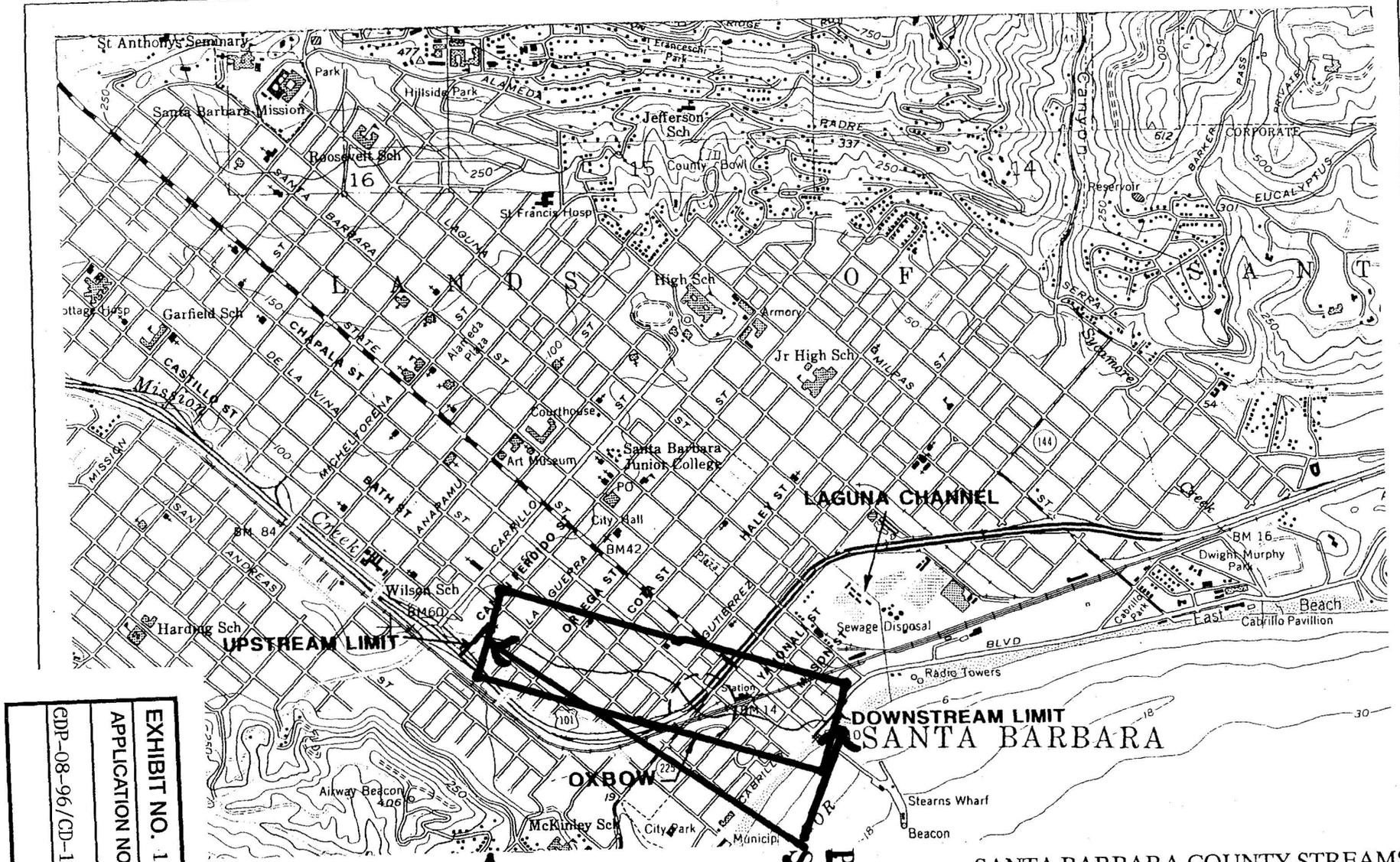


EXHIBIT NO. 1
APPLICATION NO.
CDP-08-96/CD-12-09

,000, Santa Barbara, California

2000′ 4000′

GRAPHIC SCALE: 1″=2000′

EXHIBIT NO. 1

APPLICATION NO. 17-99

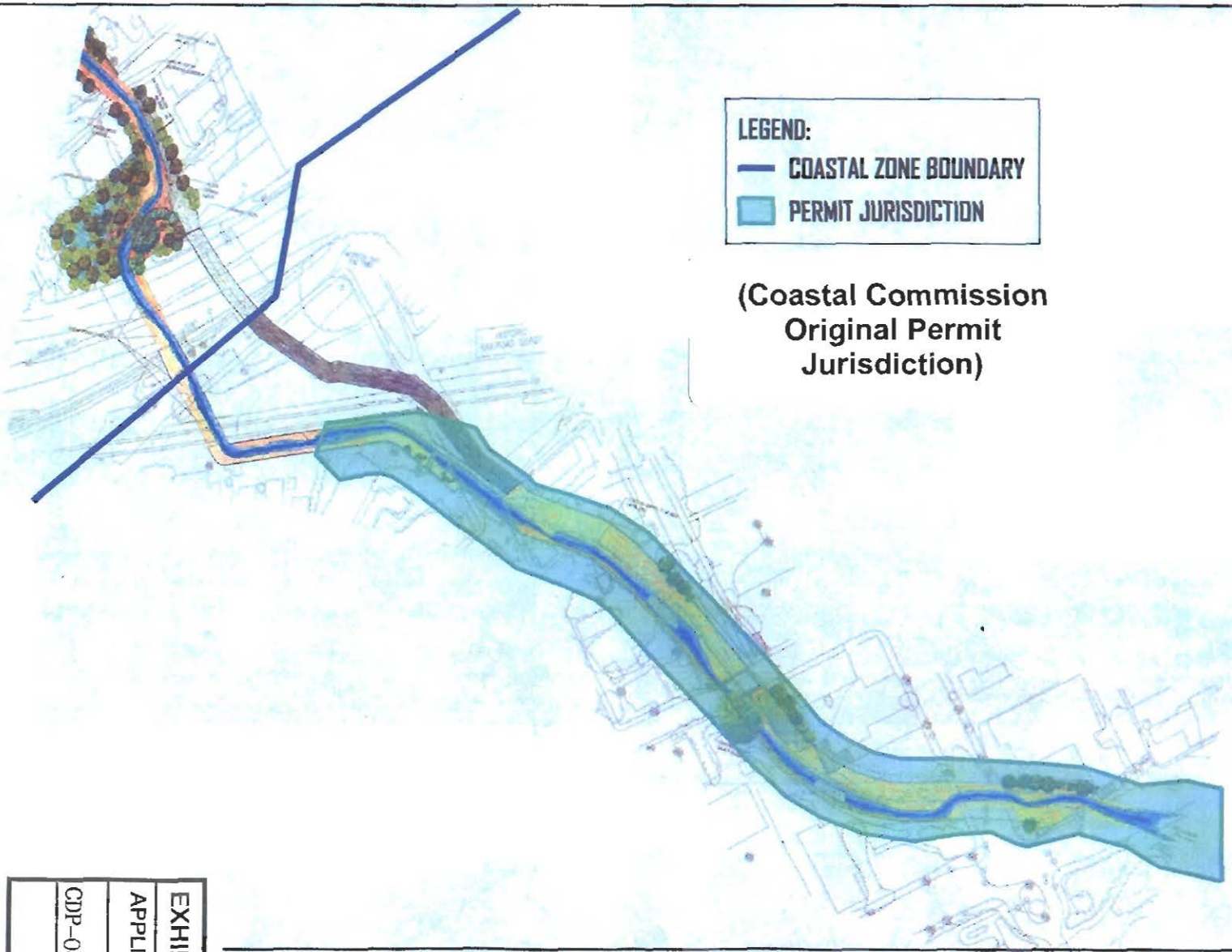
California Coastal

SITE PROJECT

SANTA BARBARA COUNTY STREAMS
LOWER MISSION CREEK

LOCATION MAP

Exhibit 2



Approximate Boundaries
For illustrative purposes

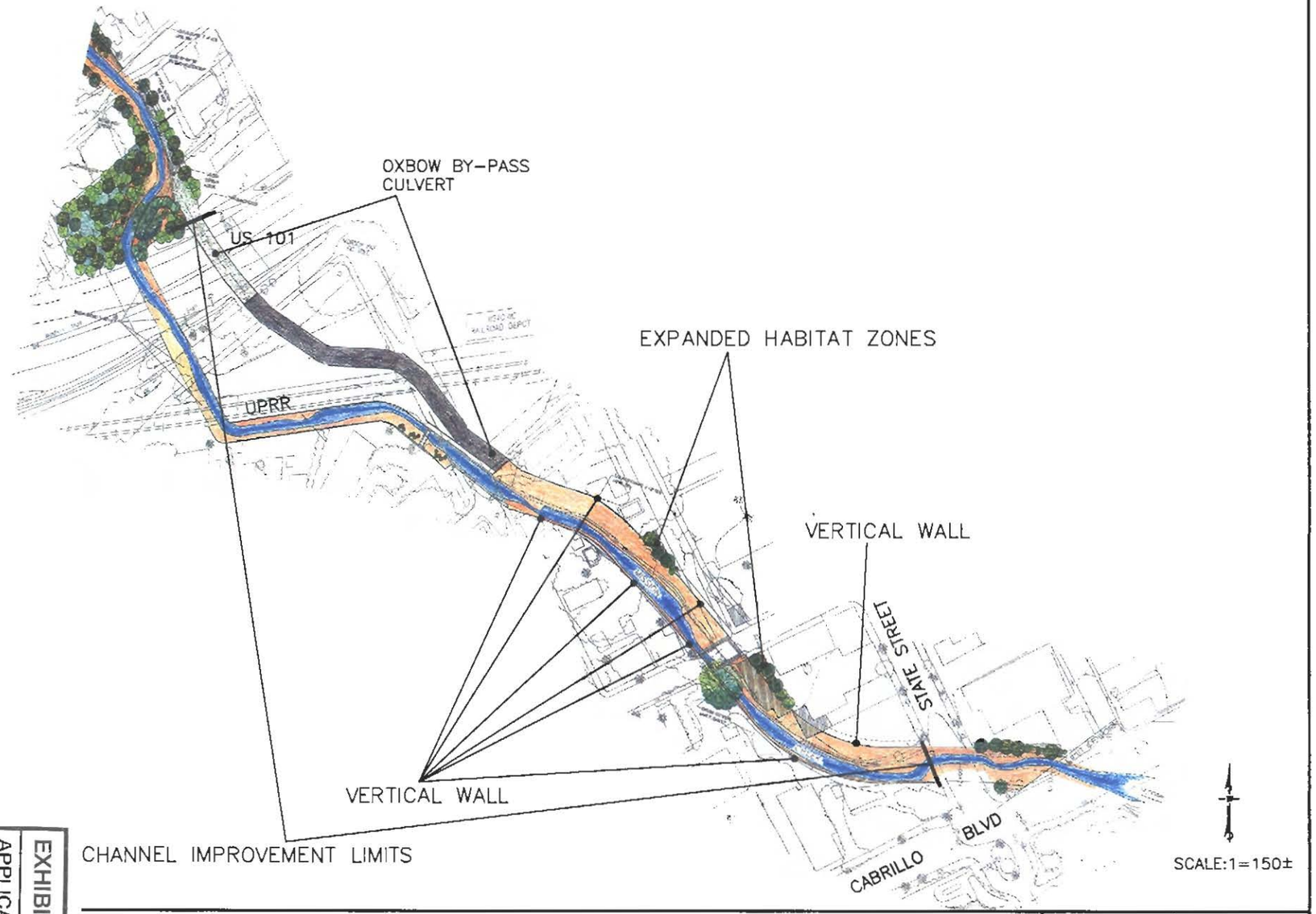
EXHIBIT NO. 1, p.2
APPLICATION NO.
CDP-08-96/CD-12-09

LOWER MISSION CREEK FLOOD CONTROL PROJECT
OVERALL PROJECT IMPROVEMENT LIMITS

Drawn By: Date: –

FIGURE 1

EXHIBIT NO. 2
APPLICATION NO.
CDP-08-96/CD-12-09



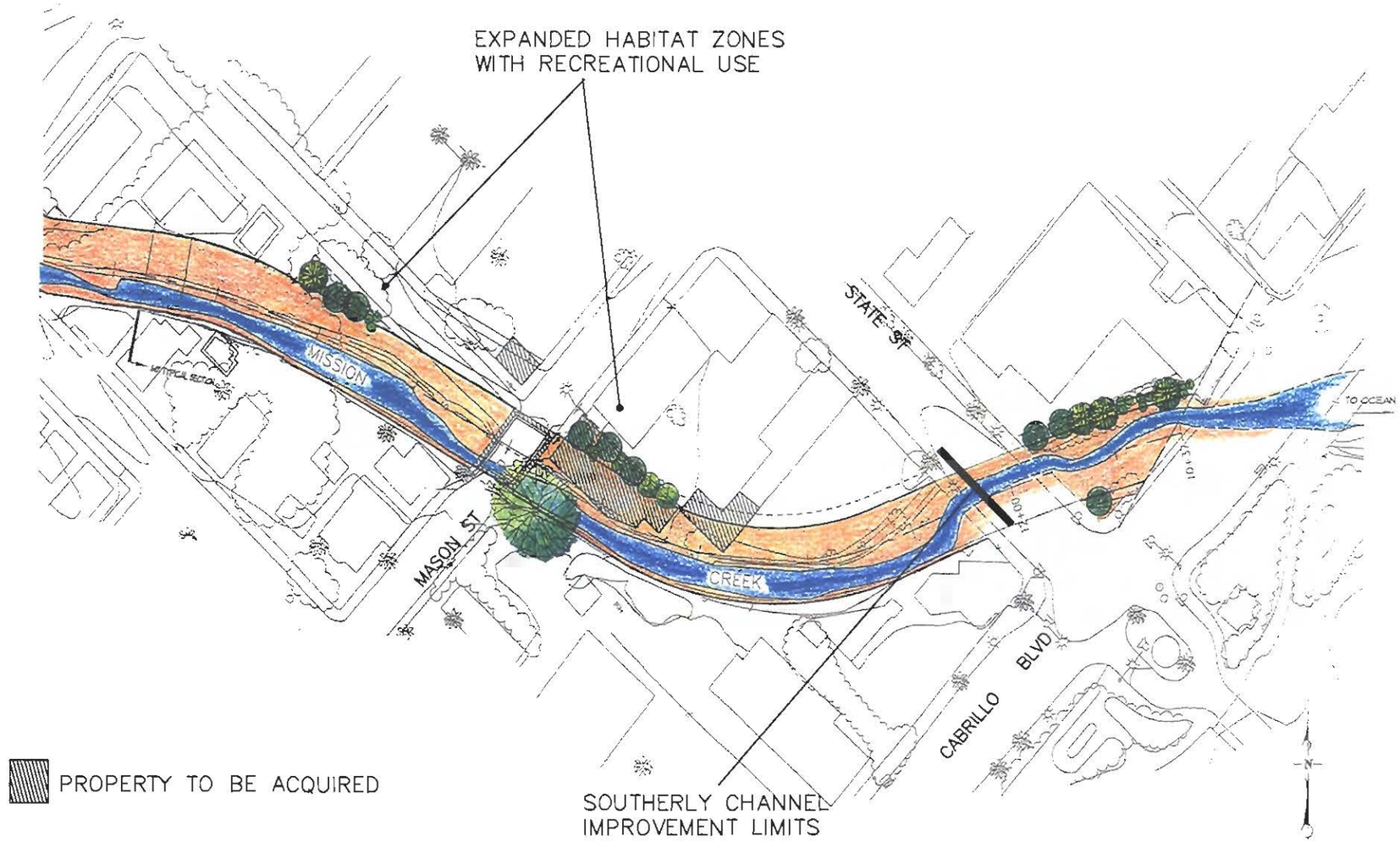
LOWER MISSION CREEK FLOOD CONTROL PROJECT

CHANNEL IMPROVEMENT LIMITS
AND
BANK TREATMENT LOCATIONS

Drawn By:	Date:
	–

FIGURE 2

EXHIBIT NO. 3
APPLICATION NO.
CDP-08-96/CD-12-09

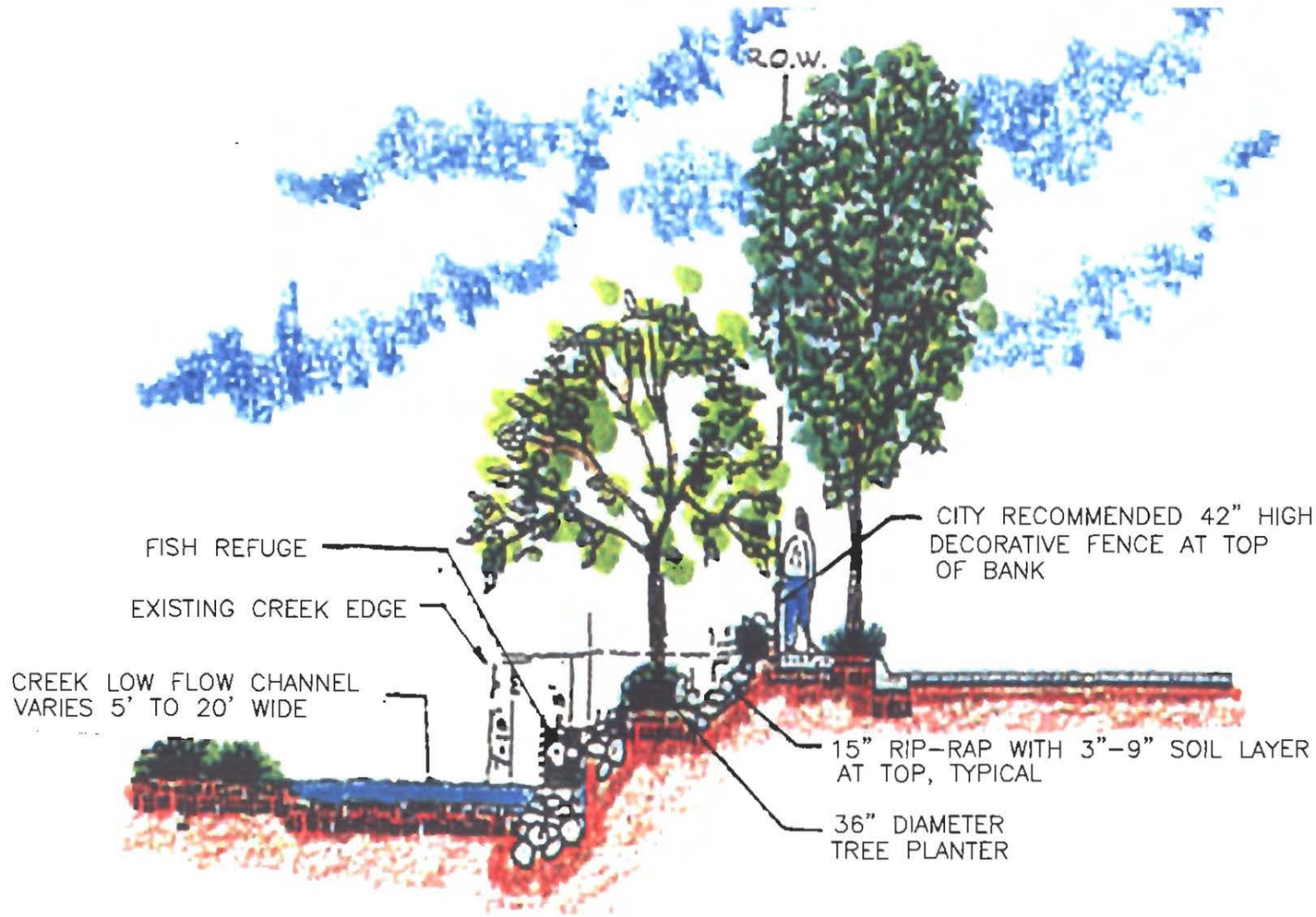


LOWER MISSION CREEK FLOOD CONTROL PROJECT

PROPERTY ACQUISITION PARCELS
AND
EXPANDED HABITAT ZONES

Drawn By:	Date:
	–

FIGURE 3

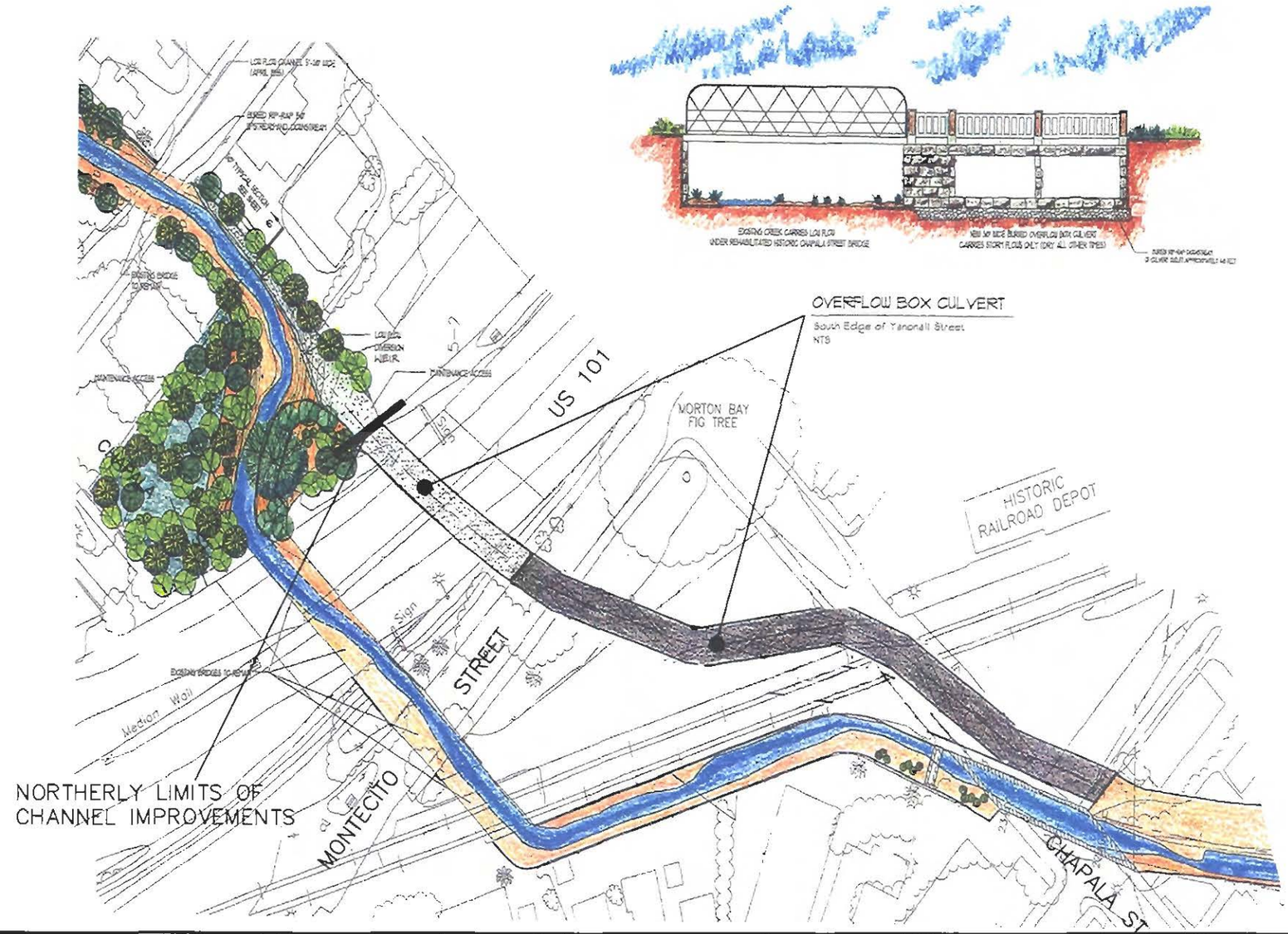


LOWER MISSION CREEK FLOOD CONTROL PROJECT

EXPANDED HABITAT ZONE PREFERRED OPTION

Drawn By:	Date:
	–

FIGURE 4

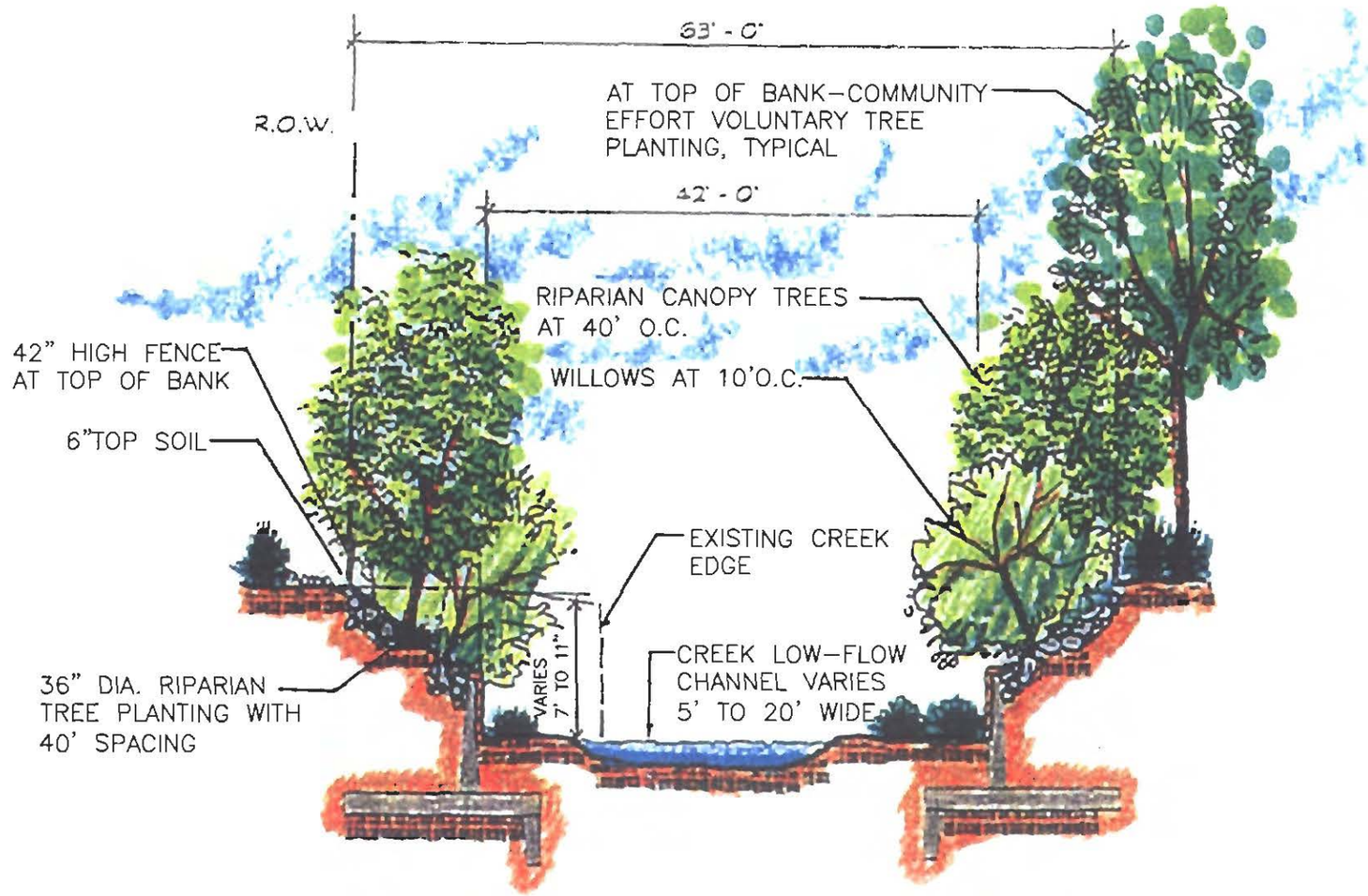


LOWER MISSION CREEK FLOOD CONTROL PROJECT

OXBOW BY-PASS CULVERT

Drawn By:	Date:
	–

FIGURE 5

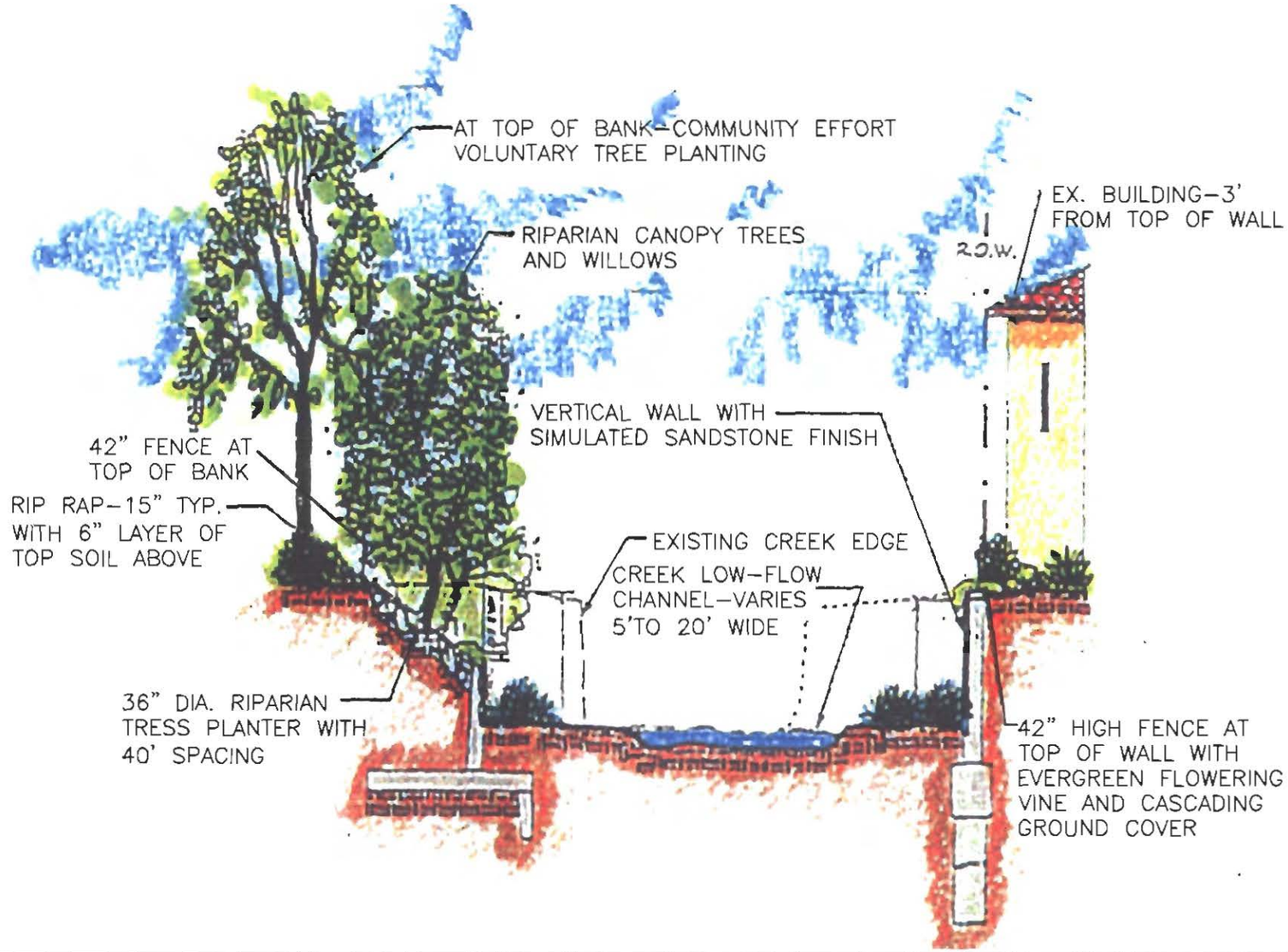


LOWER MISSION CREEK FLOOD CONTROL PROJECT

VEGETATED SIDE SLOPE

Drawn By:	Date: –

FIGURE 6



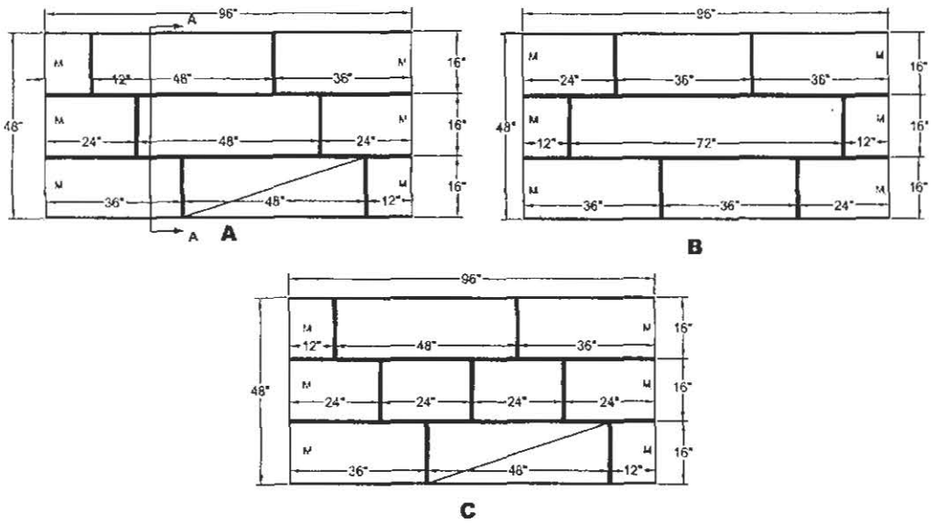
LOWER MISSION CREEK FLOOD CONTROL PROJECT

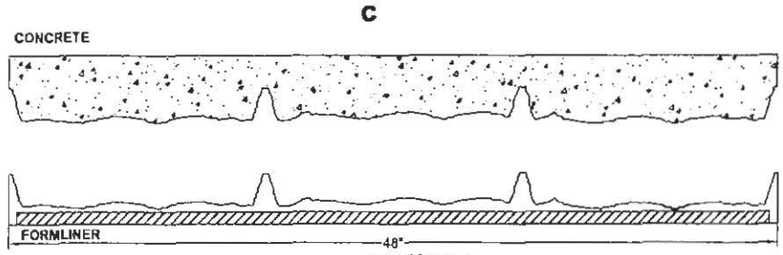
VEGETATED SIDE SLOPE AND VERTICAL WALL SECTION

Drawn By:

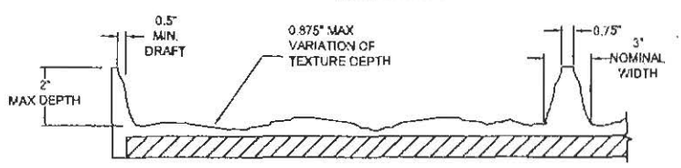
Date:

FIGURE 7





SECTION A-A



FORMLINER DETAIL

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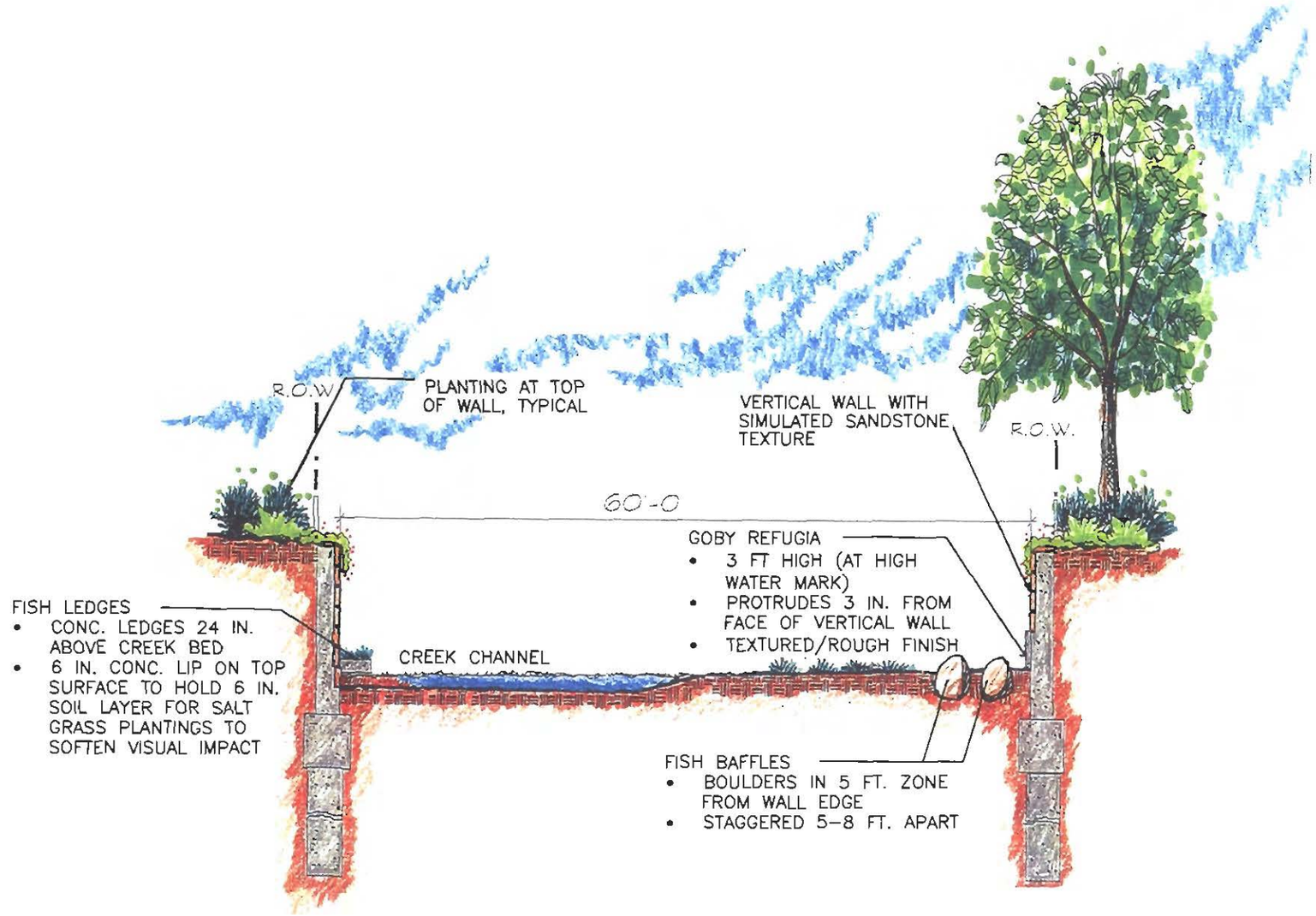
LOWER MISSION CREEK FLOOD CONTROL PROJECT

FAUX SANDSTONE
GOBY REFUGIA

Drawn By:	Date:

FIGURE 8

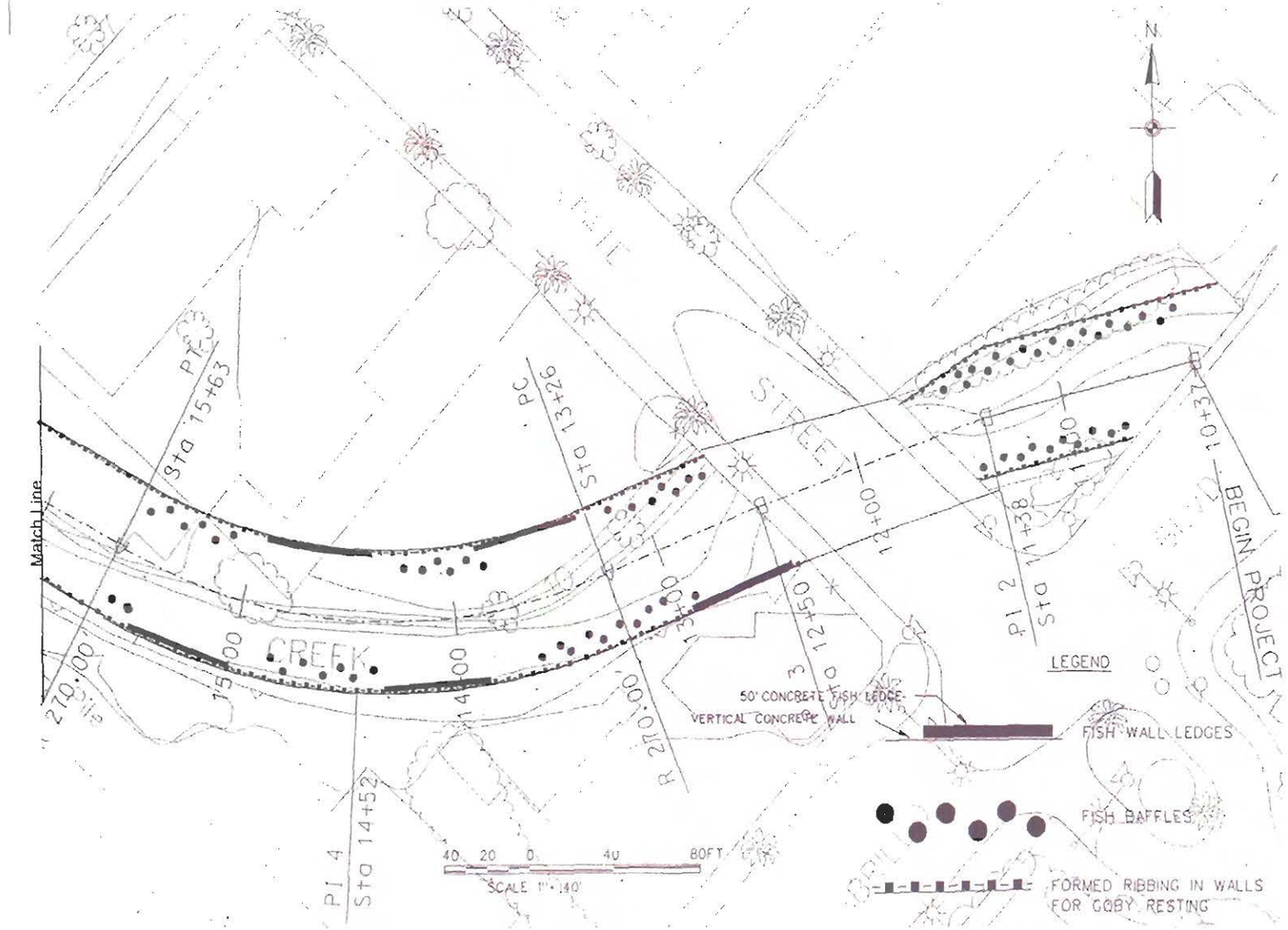


LOWER MISSION CREEK FLOOD CONTROL PROJECT

FISH LEDGES AND GOBY REFUGIA

Drawn By:	Date:
	–

FIGURE 9

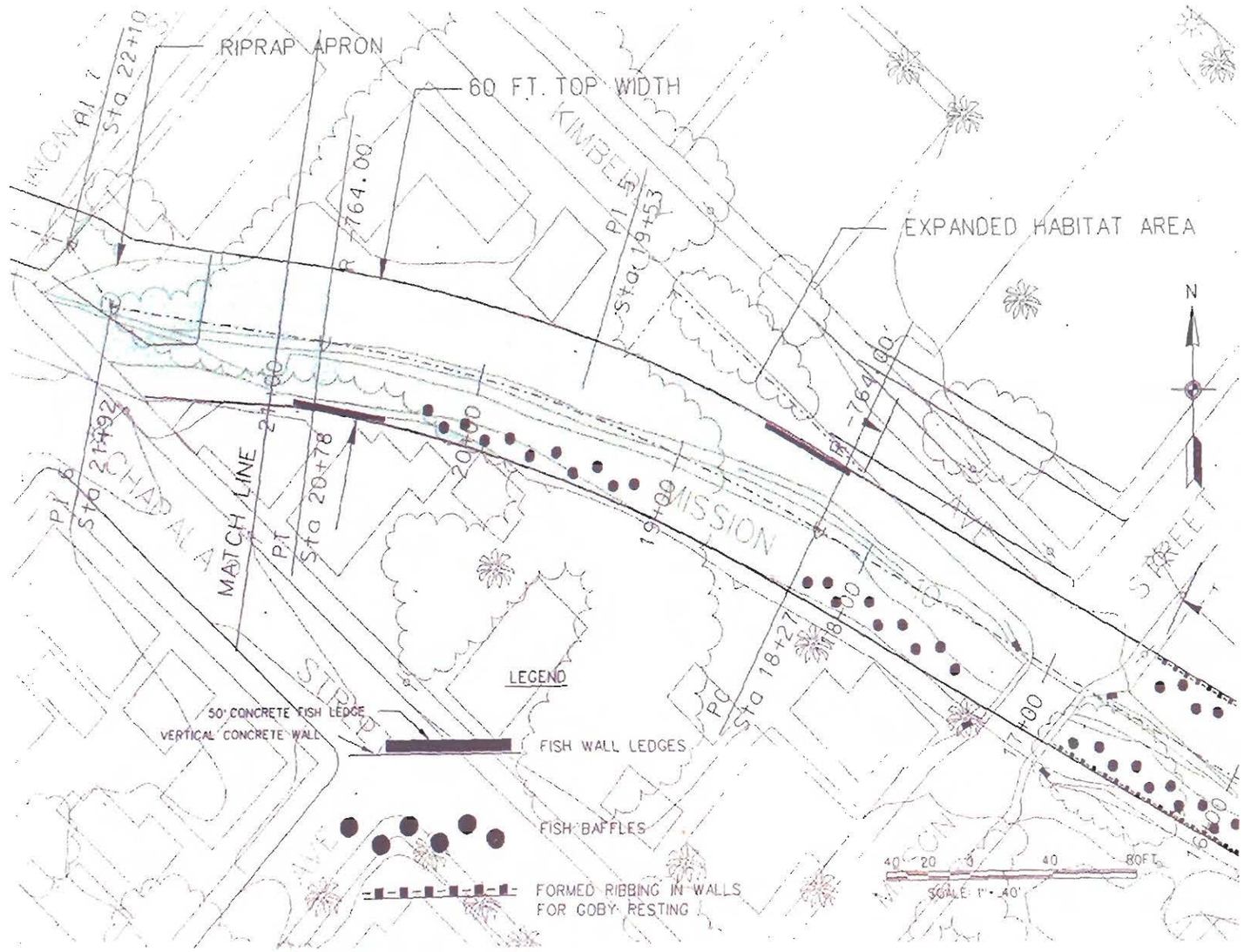


LOWER MISSION CREEK FLOOD CONTROL PROJECT

FISH LEDGES AND GOBY REFUGIA LOCATIONS

Drawn By:	Date:
	–

FIGURE 10

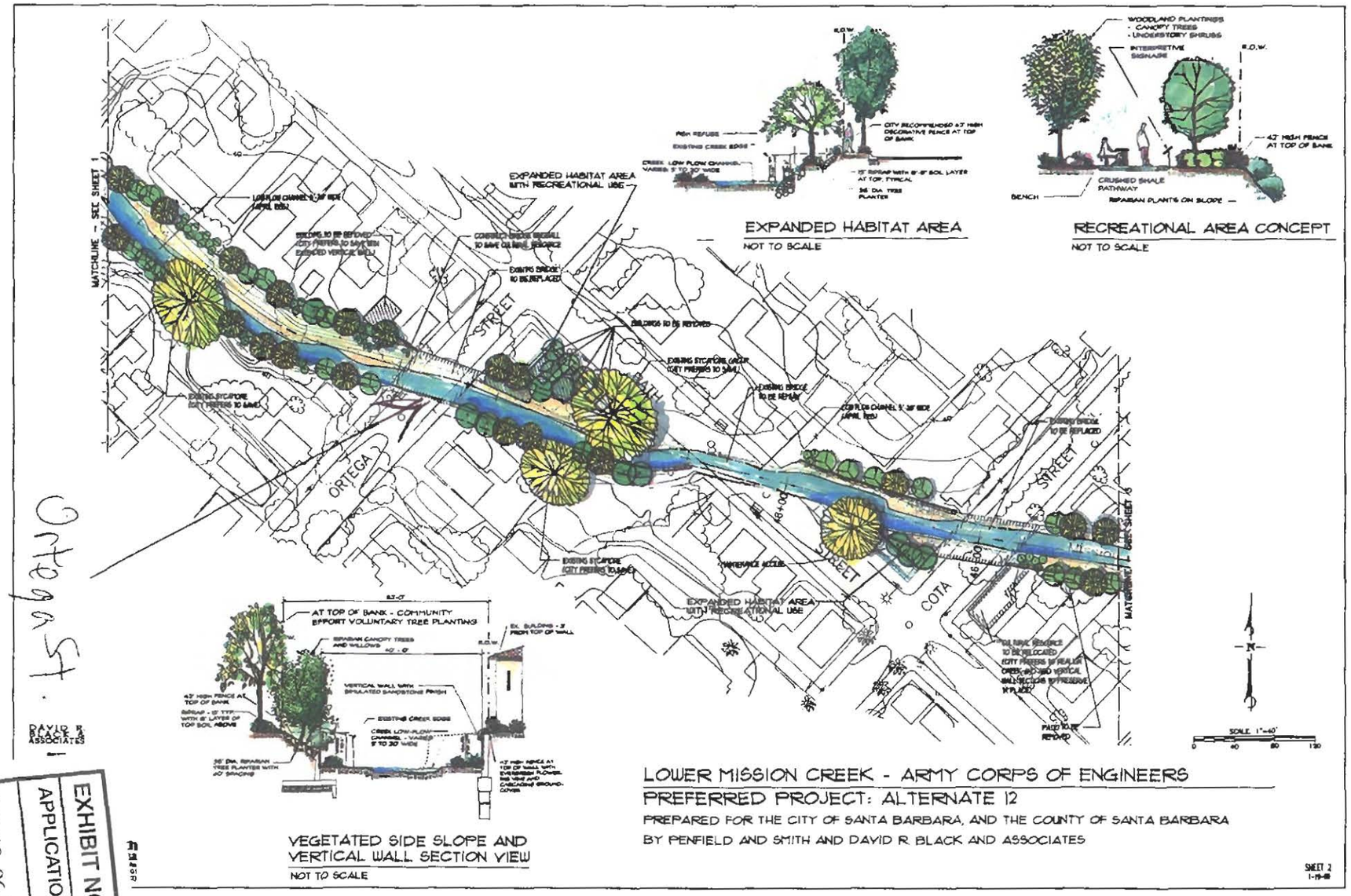


LOWER MISSION CREEK FLOOD CONTROL PROJECT

FISH LEDGES AND GOBY REFUGIA LOCATIONS

Drawn By: | Date:

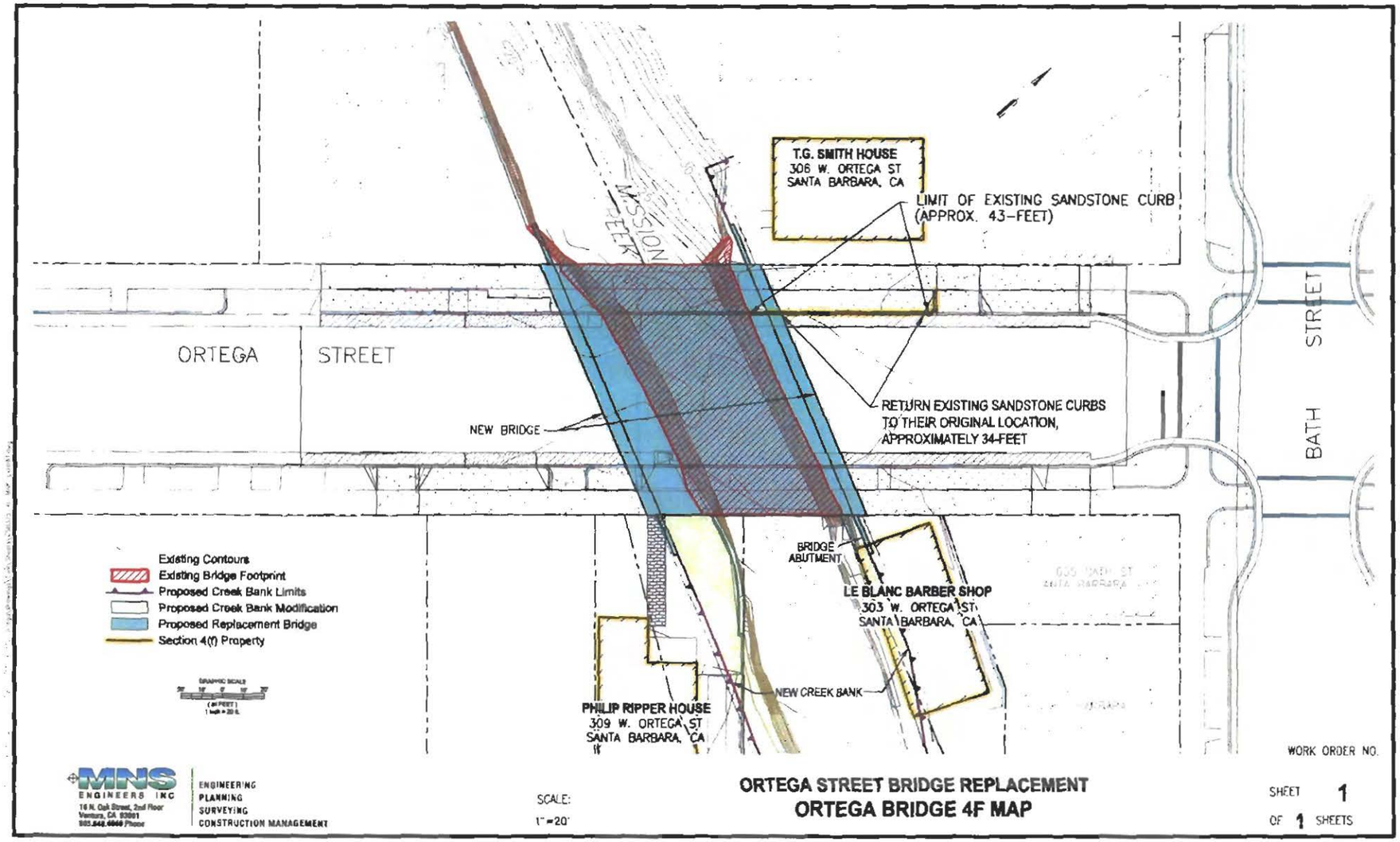
FIGURE 11



Ortega St.

DAVID R. BLACK & ASSOCIATES

EXHIBIT NO. 4
APPLICATION NO.
CDP-08-96/CD-12-09



Ortega Bridge 4(f) Properties

The Commission hereby approves a coastal development permit for the proposed development and adopts the findings set forth below on grounds that the development as conditioned will be in conformity with the policies of Chapter 3 of the Coastal Act and will not prejudice the ability of the local government having jurisdiction over the area to prepare a Local Coastal Program conforming to the provisions of Chapter 3. Approval of the permit complies with the California Environmental Quality Act because either 1) feasible mitigation measures and/or alternatives have been incorporated to substantially lessen any significant adverse effects of the development on the environment, or 2) there are no further feasible mitigation measures or alternatives that would substantially lessen any significant adverse impacts of the development on the environment.

II. STANDARD CONDITIONS

1. Notice of Receipt and Acknowledgment. This permit is not valid and development shall not commence until copies of the permit, signed by the permitee or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.

2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.

3. Interpretation. Any questions of intent or interpretation of any term or condition will be resolved by the Executive Director or the Commission.

4. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.

5. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permitee to bind all future owners and possessors of the subject properties to the terms and conditions.

III. SPECIAL CONDITIONS

1. Compliance with City of Santa Barbara Conditions of Approval

All conditions of approval contained in the City of Santa Barbara Planning Commission's Resolution No. 029-07 **(Exhibit 1)** applicable to the proposed project are hereby incorporated as special conditions of the subject permit unless specifically modified by any additional special conditions set forth herein.

EXHIBIT NO. 5
APPLICATION NO.
CDP-08-96/CD-12-09
4-07-134 Cabrillo Bridge-CCC Conditions

2. Compliance with Approved Mitigation Measures

All mitigation measures required in Final Mitigated Negative Declaration No. MST2004-00878 approved by the city Council in Resolution No. 029-07 applicable to the proposed project **(Exhibit 2)** are hereby incorporated by reference as special conditions of the subject permit unless specifically modified by any additional special conditions set forth herein.

3. Other Federal, State, or Local Approvals

Prior to commencement of development, the applicant shall submit, for the review and approval of the Executive Director, either evidence of final required approvals or evidence that no approval is needed from the Army Corps of Engineers (ACOE), Regional Water Quality Control Board (RWQCB), California Department of Fish and Game, State Historic Preservation Office (if needed), United States Fish and Wildlife Service, and the National Marine Fisheries Service.

4. Timing of Operations

a. Except for installation of sheet piles for partial dewatering and diversion for pile installation, abutment construction, and bank protection, construction work in the channel and on the banks of Mission creek and lagoon, including construction of cofferdams, shall not occur during the period from November 1 through March 31, unless authorized by the Executive Director. This schedule shall be subject to revision, if authorized by the Executive Director, dependent on weather conditions and monitoring for spawning of tidewater goby. Installation of cofferdams and full dewatering and diversion of Mission creek shall not begin until forecasts from the National Weather Service provide reasonable assurance that the winter rainfall has ended. Installation of cofferdams and full dewatering and diversion of the creek shall not occur during the tidewater goby spawning season, as indicated through the tidewater goby monitoring required in Special Condition Five (5).

b. Pile driving shall occur during September 1 to December 1 in order to avoid the adult steelhead migration period and avian nesting/breeding season. The ending date may be moved to as late as December 31 if the lagoon remains closed by its own forces and if authorized by the Executive Director.

5. Tidewater Goby and Aquatic Species Management Plan

Prior to issuance of the coastal development permit, the applicant shall submit, for the review and approval of the Executive Director, a final plan for the protection of tidewater goby. The plan shall include the following elements:

1. Pre-construction monitoring surveys for tidewater goby shall be implemented at the upstream, downstream, and mid-lagoon bridge areas, one year prior to construction. These surveys shall include one pre-spawn survey and one post-spawn survey. Pre-construction surveys shall be conducted by a biologist approved to handle

tidewater gobies under a Section 10a1a recovery permit to determine the general abundance of tidewater gobies.

2. At least four (4) weeks prior to commencement of any onset of work, the City shall submit the name and qualifications of a tidewater goby biologist or specialist, for the review and approval of the Executive Director. The applicant shall retain the services of the qualified biologist(s) or environmental resource specialist(s) to develop and implement the Tidewater Goby Protection Plan and to monitor project operations.
3. The authorized biologist retained by the City shall conduct a training session for all construction personnel prior to the onset of work. The training shall include a description of the tidewater goby and its habitat; the specific measures that are being implemented to protect the tidewater goby during construction; and the project limits.
4. The authorized biologist shall complete initial surveys for tidewater gobies within the project area one week prior to the onset of work.
5. The authorized biologist and a crew working under his/her direction shall clear all fish, including tidewater gobies, from the area to be dewatered prior to construction.
6. The authorized biologist shall inspect the dewatered areas and construction site regularly to detect whether any tidewater gobies or other fish are passing through the cofferdam and investigate whether tidewater goby protection measures are being implemented.
7. The qualified biologist shall be present when the cofferdams are removed and the construction area refilled with water to relocate any fish present in the construction area before completion of removal operations and to ensure successful reintroduction of aquatic habitat in the construction area.
8. Following construction, the authorized biologist shall complete post-construction surveys for tidewater gobies in Mission Creek.
9. The qualified biologist shall prepare a post-project monitoring report documenting the efforts to protect the goby, the results, and recommendation for future projects involving similar procedures. In the event that monitoring shows a significant decrease in the goby population that cannot be readily explained by natural factors or is clearly linked to the Project, the authorized biologist, in consultation with the USFWS and other experts, shall recommend a course of action to address the problem.

6. <u>Biological Surveys and Construction Monitoring</u>

A. The City shall retain the services of a qualified biologist(s) or environmental resource specialist(s) to conduct surveys for sensitive wildlife species and raptors and to monitor project operations. At least two (2) weeks prior to commencement of any project operations, the City shall submit the name and qualifications of the biologist or specialist, for the review and approval of the Executive Director. The

City shall ensure that all project construction and operations shall be carried out consistent with the following:

1. The environmental resource specialist shall conduct a survey of all areas within 500 feet of the project site to determine presence and behavior of sensitive wildlife species and raptors, no more than 7 days prior to any project operations including construction, grading, excavation, vegetation eradication and removal, hauling, and maintenance activities.
2. In the event that any sensitive wildlife species or raptors exhibit reproductive or nesting behavior, the environmental specialist shall immediately notify the City, the Executive Director and local resource agencies in writing. The City shall immediately cease development activities upon receipt of such notice. Project activities shall resume only upon written approval of the Executive Director.
3. In the event that any sensitive wildlife species are present in the project area but do not exhibit reproductive behavior and are not within the estimated breeding/reproductive cycle of the subject species, the environmental resource specialist shall either: (1) initiate a salvage and relocation program prior to any excavation/maintenance activities to move sensitive species by hand to safe locations elsewhere along the project reach or (2) as appropriate, implement a resource avoidance program with sufficient buffer areas to ensure adverse impacts to such resources are avoided. The City shall also immediately notify the Executive Director of the presence of such species and which of the above actions are being taken. If the presence of any such sensitive species requires review by the United States Fish and Wildlife Service and/or the California Department of Fish and Game, then no development activities shall be allowed or continue until any such review and authorizations to proceed are received, subject to the approval of the Executive Director.

B. The environmental resource specialist shall be present during all construction, grading, excavation, vegetation eradication and removal, hauling, and maintenance activities. The environmental resource specialist shall require the applicant to cease work should any breach in permit compliance occur, or if any unforeseen sensitive habitat issues arise. The environmental resource specialist(s) shall immediately notify the Executive Director if activities outside of the scope of notice of coastal development permit 4-07-134 occur. If significant impacts or damage occur to sensitive habitats or to wildlife species, the applicants shall be required to submit a revised, or supplemental program to adequately mitigate such impacts. The revised, or supplemental, program shall be processed as an amendment to this coastal development permit or a new coastal development permit.

7. <u>Protection of Water Quality</u>

It shall be the applicant's responsibility to ensure that the following occurs during project operations:

A. In order to minimize impacts to Mission Creek from storm water runoff associated with Cabrillo Boulevard, the City shall install filtration basket inserts within the catch basins at the Cabrillo Bridge.

B. The work area shall be flagged to identify limits of construction and identify natural areas that are off limits to construction traffic.

C. No construction materials, debris, or waste shall be stored on the beach or where it may be subject to erosion and dispersion. Construction debris and sediment shall be properly contained and secured on site with BMPs to prevent the unintended transport of sediment and other debris into coastal waters by wind, rain or tracking. Construction debris and sediment shall be removed from construction areas as necessary to prevent the accumulation of sediment and other debris that may be discharged into coastal waters. Any and all debris resulting from construction activities shall be removed from the project site within 24 hours. Debris shall be disposed at a debris disposal site outside of the coastal zone or at a location within the coastal zone authorized to receive such material.

D. No equipment shall be stored in the project area, including designated staging and/or stockpile areas, except during active project operations.

E. Only areas essential for construction shall be cleared.

F. Construction equipment shall not be cleaned on the beach or in the beach parking lots.

G. Stockpiled materials shall be located as far from stream areas on the designated site(s) as feasible and in no event shall materials be stockpiled closer than 30 ft. in distance from the top edge of a stream bank.

H. All debris and other construction materials shall be cleared from Mission Creek prior to reintroduction of stream flows and tidal action to the channel following removal of the cofferdams and sheet piles.

8. Erosion Control Plans

Prior to commencement of development, the City shall submit two (2) sets of final erosion control plans, prepared by a qualified engineer, for review and approval by the Executive Director. The plans shall be consistent with all measures required pursuant to Special Condition Seven (7). The plans shall also incorporate the following criteria:

(1) The plan shall delineate the areas to be disturbed by grading or construction activities and shall include any temporary access roads, staging areas and stockpile areas. The natural areas on the site shall be clearly delineated on the project site with fencing or survey flags.

(2) The final erosion control plans shall specify the location and design of erosion control measures to be implemented during the rainy season (November 1 – May 1). The City shall install or construct temporary sediment basins (including debris basins, desilting basins or silt traps), temporary drains and swales, sand bag barriers, silt fencing, stabilize any stockpiled fill with

geofabric covers or other appropriate cover, install geotextiles or mats on all cut or fill slopes and close and stabilize open trenches as soon as possible. Straw bales shall not be approved. These erosion measures shall be required on the project site prior to or concurrent with the initial grading operations and maintained throughout the development process to minimize erosion and sediment from runoff waters during construction. All sediment shall be retained on-site unless removed to an appropriate approved dumping location either outside the coastal zone or to a site within the coastal zone permitted to receive fill.

(3) The plan shall also include temporary erosion control measures should grading or site preparation cease for a period of more than 30 days, including but not limited to: stabilization of all stockpiled fill, access roads, disturbed soils and cut and fill slopes with geotextiles and/or mats, sand bag barriers, silt fencing; temporary drains and swales and sediment basins. The plans shall also specify that all disturbed areas shall be seeded with native grass species and include the technical specifications for seeding the disturbed areas. These temporary erosion control measures shall be monitored and maintained until grading or construction operations resume.

(4) Storm drain inlets shall be protected from sediment-laden waters by the use of inlet protection devices such as gravel bag barriers, filter fabric fences, block and gravel filters, and excavated inlet sediment traps.

9. Plans Conforming to Geologic Recommendation

All recommendations contained in the applicable geotechnical reports submitted for Coastal Development Permit 4-07-134, shall be incorporated into all final design and construction plans, including foundation, grading and drainage. All final plans must be reviewed and approved by the City engineer and verified as incorporating the applicable recommendations of the geotechnical reports. Prior to the commencement of development the City shall submit, for review and approval by the Executive Director, evidence of the City engineer's review and approval of all final project plans

10. Assumption of Risk

By acceptance of this permit, the City acknowledges and agrees (i) that the site may be subject to hazards from erosion, wave action, tidal action, earth movement, and flooding; (ii) to assume the risks to the City and the property that is the subject of this permit of injury and damage from such hazards in connection with this permitted development; (iii) to unconditionally waive any claim of damage or liability against the Commission, its officers, agents, and employees for injury or damage from such hazards; and (iv) to indemnify and hold harmless the Commission, its officers, agents, and employees with respect to the Commission's approval of the project against any and all liability, claims, demands, damages, costs (including costs and fees incurred in defense of such claims), expenses, and amounts paid in settlement arising from any injury or damage due to such hazards.

11. Removal of Excess Excavated Material

A. Permanent stockpiling of material on site shall not be allowed. Sediment shall be retained at the designated temporary stockpile areas for dewatering, up to approximately three months, until removed to an appropriate approved disposal location either outside the coastal zone or to a site within the coastal zone permitted to receive such fill.

B. Prior to the issuance of the Coastal Development Permit, the applicant shall provide evidence to the Executive Director of the location of the disposal site for all excess excavated material from the site. If the disposal site is located in the Coastal Zone, the disposal site must have a valid coastal development permit for the disposal of fill material. If the disposal site does not have a coastal permit, such a permit will be required prior to the disposal of material.

12. Final Project Plans

A. Prior to the issuance of the coastal development permit, the City shall submit, for the review and approval of the Executive Director, two (2) sets of final project plans, including site plans, elevations, grading plans, restoration/landscaping plans, dewatering plan, and other plans required by the special conditions of this permit. The final project plans shall be in substantial conformance with those plans submitted by the City in October 2007 and January 2008.

B. The City shall undertake development in accordance with the approved final plans. No changes to the approved final plans shall occur without a Commission approved amendment to the coastal development permit or new coastal development permit, unless the Executive Director determines that no amendment or new permit is required.

13. Habitat Enhancement and Revegetation Monitoring Program

A. Prior to the issuance of the coastal development permit, the City shall submit, for the review and approval of the Executive Director, a final Habitat Restoration, Enhancement, Monitoring, and Management Program for restoration of the creek banks upstream and downstream of the Cabrillo Bridge. This program shall be prepared by a qualified biologist or environmental resource specialist and shall include, but not be limited to, the following:

1. Onsite habitat enhancement shall include, at a minimum, the removal of any and all invasive plant species on the site and revegetation of all disturbed areas with appropriate native species of local genetic stock, including areas where invasive and non-native plants were removed;
2. Indication as to the location, type, and height of any temporary fencing that will be used for restoration. The plans shall also indicate when this fencing is to be removed.
3. Indication on plans that invasive plant species shall be removed from all development and restoration areas for the life of the project.

4. Indication on plans that herbicides shall not be used within the creek habitat. Target non-native or invasive species shall be removed by hand.
5. Indication on plans that rodenticides containing any anticoagulant compounds (including, but not limited to, Warfarin, Brodifacoum, Bromadiolone or Diphacinone) shall not be used.
6. A baseline assessment, including photographs, of the current physical and ecological condition of the proposed restoration site, including, a biological survey, a description and map showing the area and distribution of existing vegetation types, and a map showing the distribution and abundance of any sensitive species.
7. A description of the goals of the restoration plan, including, as appropriate, topography, hydrology, vegetation types, sensitive species, and wildlife usage.
8. Documentation of performance standards, which provide a mechanism for making adjustments to the mitigation site when it is determined, through monitoring, or other means that the restoration techniques are not working.
9. Documentation of the necessary management and maintenance requirements, and provisions for timely remediation should the need arise.
10. A planting palette (seed mix and container plants), planting design, source of plant material, and plant installation. The planting palette shall be made up exclusively of native plants that are appropriate to the habitat and region and that are grown from seeds or vegetative materials obtained from local natural habitats so as to protect the genetic makeup of natural populations. Horticultural varieties shall not be used. Plantings shall be maintained in good growing condition throughout the life of the project and, whenever necessary, shall be replaced with new plant materials to ensure continued compliance with the revegetation requirements. No plant species listed as problematic and/or invasive by the California Native Plant Society, the California Exotic Pest Plant Council, or by the State of California shall be employed or allowed to naturalize or persist on the site. No plant species listed as a 'noxious weed' by the State of California or the U.S. Federal Government shall be utilized or maintained within the property.
11. Sufficient technical detail on the restoration design including, at a minimum, a planting program including a description of planned site preparation, method and location of exotic species removal, timing of planting, plant locations and elevations on the baseline map, and maintenance timing and techniques.
12. A plan for documenting and reporting the physical and biological "as built" condition of the site within 30 days of completion of the initial restoration activities. The report shall describe the field implementation of the approved restoration program in narrative and photographs, and report any problems in the implementation and their resolution.
13. Documentation that the project will continue to function as viable native habitats, as applicable, over the long term.

14. A Monitoring Program to monitor the Restoration and Enhancement. Said monitoring program shall set forth the guidelines, criteria and performance standards by which the success of the enhancement and restoration shall be determined. The monitoring programs shall include but not be limited to the following:

    (a) Interim and Final Success Criteria. Interim and final success criteria shall include, as appropriate: species diversity, total ground cover of vegetation, vegetative cover of dominant species and definition of dominants, wildlife usage, hydrology, and presence and abundance of sensitive species or other individual "target" species.

    (b) Interim Monitoring Reports. The City shall submit, for the review and approval of the Executive Director, on an annual basis, for a period of five (5) years, a written monitoring report, prepared by a monitoring resource specialist indicating the progress and relative success or failure of the enhancement on the site. This report shall also include further recommendations and requirements for additional enhancement/ restoration activities in order for the project to meet the criteria and performance standards. This report shall also include photographs taken from predesignated sites (annotated to a copy of the site plans) indicating the progress of recovery at each of the sites. Each report shall be cumulative and shall summarize all previous results. Each report shall also include a "Performance Evaluation" section where information and results from the monitoring program are used to evaluate the status of the enhancement/restoration project in relation to the interim performance standards and final success criteria.

    (c) Final Report. At the end of the five-year period, a final detailed report on the restoration shall be submitted for the review and approval of the Executive Director. If this report indicates that the enhancement/ restoration project has, in part, or in whole, been unsuccessful, based on the performance standards specified in the restoration plan, the applicant(s) shall submit within 90 days a revised or supplemental restoration program to compensate for those portions of the original program which did not meet the approved success criteria. The revised or supplemental program shall be processed as an amendment to this coastal development permit.

    (d) Monitoring Period and Mid-Course Corrections. During the five-year monitoring period, all artificial inputs (e.g., irrigation, soil amendments, plantings) shall be removed except for the purposes of providing mid-course corrections or maintenance to insure the survival of the enhancement/restoration site. If these inputs are required beyond the first two years, then the monitoring program shall be extended for every additional year that such inputs are required, so that the success and sustainability of the enhancement/restoration is insured. The enhancement/restoration site shall not be considered successful until it is able to survive without artificial inputs.

B. The City shall undertake development in accordance with the final approved plans. Any proposed changes to the approved final plans shall be reported to the Executive Director. No changes to the approved final plans shall occur without a Coastal Commission approved amendment to this coastal development permit or a new coastal development permit, unless the Executive Director determines that no new amendment or permit is legally required.

14. <u>Herbicide Use</u>

Herbicide use shall be restricted to the use of Glyphosate Aquamaster™ (previously Rodeo™) herbicide for the elimination of non-native and invasive vegetation located within upland and transitional areas of the project site for purposes of habitat restoration only. No use of any herbicide shall occur during the rainy season (November 1 – March 31) unless otherwise allowed by the Executive Director for good cause. In no instance shall herbicide application occur if wind speeds on site are greater than 5 mph or 48 hours prior to predicted rain. In the event that rain does occur, herbicide application shall not resume again until 72 hours after rain.

IV. FINDINGS AND DECLARATIONS

A. PROJECT DESCRIPTION

The City of Santa Barbara Public Works Department is proposing to replace the structurally deficient Cabrillo Bridge over Mission Creek in the City of Santa Barbara **(Exhibit 3)**. According to engineering analysis, the existing bridge has deteriorated and is not expected to be able to safely carry the amount and weight of future traffic unless it is replaced. The project would also improve the hydraulic conveyance of Mission Creek and involve the reconstruction and restoration of portions of Mission Creek and Lagoon between State Street and the Pacific Ocean in the City of Santa Barbara.

The project area includes areas under the jurisdiction of the City of Santa Barbara Land Use Plan (generally from the center of Cabrillo Bridge north) and areas designated as the retained jurisdiction of the Coastal Commission (generally from the center of Cabrillo Bridge south). The subject coastal development permit is for that portion of the project in the retained jurisdiction of the Commission. This includes the majority of the bridge area and that portion of Mission Creek and Lagoon extending approximately 150 feet south or downstream of the bridge **(Exhibit 4)**. On July 12, 2007 the City of Santa Barbara approved a mitigated negative declaration on the whole project and a coastal development permit (MST2004-00878; CDP2007-00001) for that portion of the project north of Cabrillo Boulevard within the City's LCP appealable area. The conditions of approval can be found in Exhibit 1. The notice of final action for the permit (4-SBC-07-202) was received by the Commission on July 26, 2007 and no appeal was filed with the Commission within the allowable appeal period that ended August 9, 2007.

2. Site Plans

3. Correspondence received in opposition to the project:

   a. Erik and Alex Funke, Santa Barbara

NOW, THEREFORE BE IT RESOLVED that the City Planning Commission:

I. Approved the subject application making the following findings and determinations:

1. The project is consistent with the policies of the California Coastal Act.
2. The project is consistent with all applicable policies of the City's Local Coastal Plan, all applicable implementing guidelines, and all applicable provisions of the Code.
3. The project is consistent with the Chapter 3 (commencing with Section 30200) Policies of the Coastal Act regarding public access and public recreation.

II. Said approval is subject to the following conditions:

A. **Project Description.** The development of the Real Property approved by the Planning Commission on September 18, 2008 is limited to the improvements shown on the plans (Figures 1-10 attached to the Project Description in the EIS/EIR Addendum) signed by the chairman of the Planning Commission on said date and on file at the City of Santa Barbara. This project would result in the construction of an oxbow bypass culvert between the northern edge of U.S. Highway 101 and Chapala Street, widening of Mission Creek south of the bypass by up to a maximum of 60 feet, and construction of vertical banks, and vertical banks with vegetated slopes in expanded riparian habitat areas in two areas where existing structures would be removed. The oxbow bypass would not be connected to Mission Creek north of Highway 101 as part of this permit. The Mason Street bridge would be replaced. Total material to be excavated is estimated to be 21,000 cubic yards. The project includes construction of fish ledges, use of grout lines in sandstone walls for tidewater goby hideouts, and use of boulder clusters to improve fish habitat. Revegetation of a portion of the lagoon south of Cabrillo Boulevard, installation of riparian vegetation above the creek banks, and maintenance of the facility is also proposed. Due to the scope of this project, this approval shall be valid as long as the work commences within ten (10) years from the date of approval of the Coastal Development permit approved by the Coastal Commission for the portion of the project located within the Coastal Commission's original jurisdiction.

B. **Coastal Commission Determination.** The applicant shall implement all of the Conditions of Approval of the Federal Coastal Consistency Determination (CCD). Each recommendation from the studies required by the CCD shall be implemented.

C. **Landscape Plans.** The Applicant shall comply with the Landscape/Restoration Plans as approved by the Historic Landmarks Commission (HLC). Such pl
modified unless prior written approval is obtained from the HLC. The
the Real Property shall be provided and maintained in accord
landscape/restoration plan.

EXHIBIT NO. 6
APPLICATION NO.
CDP–08–96/CD–12–09
City Conditions

D. **Mitigation Timing.** Mitigation applicable to each phase of construction shall be completed or initiated as applicable during that phase of construction.

E. **Design Review.** The following items are subject to the review and approval of the Historic Landmarks Commission (HLC). HLC shall not grant preliminary approval of the project until the following conditions have been satisfied.

1. **Tree Removal and Replacement.** All trees removed, except fruit trees and street trees approved for removal without replacement by the Parks Department shall be replaced on-site on a one-for-one basis with a native species propagated from seeds or seedlings collected from within the Lower Mission Creek corridor, to the maximum extent feasible.

2. **Moreton Bay Fig Tree Protection Measures.** The landscape plan(s) and grading plan(s) shall include the following tree protection measures:

   a. **Arborist's Report.** Include a note on the plans that recommendations/conditions contained in the arborist's report prepared by Dan Condon Arboricultural Consulting, dated December 19, 2007, shall be implemented.

   b. **Arborist Monitoring.** An arborist with knowledge of root systems of large ornamentals shall monitor bypass culvert construction to minimize impacts to the Moreton Bay Fig Tree. [BIO-14]

   c. **Root Protection:** Any Moreton Bay Fig Tree root over 2 inches in diameter that must be cut during excavation shall be cleanly severed using a sharp hand cutting tool. [BIO-15]

   d. **Construction Buffer:** Install a construction fence as near as possible to the limit of the excavation trench on the Moreton Bay Fig Tree buffer side. No parking or storage of construction equipment would be allowed in the buffer area. **[BIO-18]**

   e. **Tree Protection Excavation:** All excavation on the channel near the Moreton Bay Fig Tree shall be made from the side of the culvert opposite from the Moreton Bay Fig Tree. [BIO-19]

   f. **Tree Protection Mulching:** Prior to the initiation of culvert construction, remove all turf grass between the edge of the excavation trench and the drip line of the Moreton Bay Fig Tree and mulch the entire area with two-inch deep composted organic mulch to be approved by the City Arborist. [BIO-20]

3. **Tree Protection Measures.** The landscape plan (and grading plan) shall include the following tree protection measures for other trees in the project area:

   a. **Landscaping Under Trees.** Landscaping under the tree(s) shall be compatible with the preservation of the tree(s).

b. **Oak and Sycamore Tree Protection Measures.** The following provisions shall apply to existing oak and sycamore trees in the project area:

(1) Landscaping provided under the oak and sycamore trees shall be compatible with preservation of the trees as determined by the HLC. No irrigation system shall be installed under the dripline of any oak tree.

(2) Oak trees greater than four inches (4") in diameter at four feet (4') above grade removed as a result of the project shall be replaced at a three to one (3:1) ratio, at a minimum five (5) gallon size, from Lower Mission Creek watershed stock, to the maximum extent feasible.

4. **Crime Analyst Plan Review.** The Developer shall meet with the City Police Department Crime Analyst prior to Preliminary Approval to determine how lighting, locking mechanisms, egress, and fencing with special emphasis on culvert and expanded habitat access can be designed and installed to reduce the potential number of calls for police service resulting from unauthorized use of the Real Property.

5. **Screened Check Valve/Backflow.** The check valve or anti-backflow devices for irrigation systems shall be provided in a location screened from public view.

6. **Bank Planting.** Upper creek banks shall be planted with native vegetation. [AES-1]

7. **Vertical Walls/Fences.** Plant vines along the vertical walls to minimize visual impacts; cover concrete with natural color and texture. If fencing is installed in the project design for safety purposes, plant vines along fencing to minimize impacts. Upgraded fence materials shall be used in areas visible or accessible to the public. [AES-2]

8. **Concrete Treatment.** Aesthetic treatment, including the use of colored concrete and/or pouring concrete in forms that would mimic existing sandstone walls or natural vertical creek banks, shall be incorporated into project plans to minimize project-related impacts. [AES-3]

9. **Bridge Design.** Mason Street Bridge shall be designed to retain an appearance appropriate to the character of the neighborhood in which it is located. Design of the bridge shall be reviewed and approved by the Historic Landmarks Commission. [AES-4]

F. **Community Development Requirements Prior to Building or Public Works Permit Application/Issuance.** The following shall be finalized prior to, and/or submitted with, the application for any Building or Public Works permit:

1. **Project Environmental Coordinator Required.** Submit to the Planning Division a contract with a qualified representative for the Applicant, subject to approval of the contract and the representative by the Planning Division, to act as the Project Environmental Coordinator (PEC). The PEC shall be responsible for assuring full compliance with the provisions of the Mitigation Monitoring and Reporting Program (MMRP) and Conditions of Approval to the City. The contract shall include the following, at a minimum:

   a. The frequency and/or schedule of the monitoring of the mitigation measures.

   b. A method for monitoring the mitigation measures.

   c. A list of reporting procedures, including the responsible party, and frequency.

   d. A list of other monitors to be hired, if applicable, and their qualifications.

   e. Submittal of biweekly reports during demolition, excavation, grading and footing installation and biweekly reports on all other construction activity regarding MMRP and condition compliance by the PEC to the Community Development Department.

   f. The PEC shall have authority over all other monitors/specialists, the contractor, and all construction personnel for those actions that relate to the items listed in the MMRP and conditions of approval, including the authority to stop work, if necessary, to achieve compliance with mitigation measures.

2. **Neighborhood Notification Prior to Construction.** At least twenty (20) days prior to commencement of construction, the contractor shall provide written notice to all property Applicants, businesses, and residents within 300 feet of the project area. The notice shall contain a description of the project, the construction schedule, including days and hours of construction, the name and phone number of the Project Environmental Coordinator (PEC) and Contractor(s), site rules and Conditions of Approval pertaining to construction activities and any additional information that will assist the Building Inspectors, Police Officers and the public in addressing problems that may arise during construction. The language of the notice and the mailing list shall be reviewed and approved by the Planning Division prior to being distributed. An affidavit signed by the person(s) who compiled the mailing list shall be submitted to the Planning Division.

3. **Contractor and Subcontractor Notification.** The Applicant shall notify in writing all contractors and subcontractors of the site rules, restrictions, and Conditions of Approval. Submit a copy of the notice to the Planning Division.

4. **Traffic Control Plan.** A traffic control plan shall be submitted, as specified in the City of Santa Barbara Traffic Control Guidelines. Traffic Control Plans are subject to approval by the Transportation Manager.

5. **Archaeological Monitoring Contract.** Submit to the Planning Division a contract with an archaeologist from the most current City Qualified Archaeologists List for monitoring during all ground-disturbing activities associated with the project, including, but not limited to, grading, excavation, trenching vegetation or paving removal and ground clearance near archaeological sites CA-SBA-27 and SBA-28. The contract shall be subject to the review and approval of the Planning Division.

   The archaeologist's monitoring contract shall include the following provisions: If cultural resources are encountered or suspected, work shall be halted or redirected by the archaeologist immediately and the Planning Division shall be notified. The archaeologist shall assess the nature, extent and significance of any discoveries and develop appropriate management recommendations for archaeological resource treatment, which may include, but are not limited to, redirection of grading and/or excavation activities, consultation and/or monitoring with a Barbareño Chumash representative from the most current City Qualified Barbareño Chumash Site Monitors List, preparation of further site studies and/or mitigation.

   If the discovery consists of possible human remains, the Applicant shall contact the Santa Barbara County Coroner immediately. If the Coroner determines that the remains are Native American, the Coroner shall contact the California Native American Heritage Commission. The Applicant shall retain a Barbareño Chumash representative from the most current City Qualified Barbareño Chumash Site Monitors List shall be retained to monitor all further subsurface disturbance in the area of the find. Work in the area may only proceed after the Planning Division grants authorization.

   If the discovery consists of possible prehistoric or Native American artifacts or materials, the Applicant shall retain a Barbareño Chumash representative from the most current City Qualified Barbareño Chumash Site Monitors List shall be retained to monitor all further subsurface disturbance in the area of the find. Work in the area may only proceed after the Planning Division grants authorization. (CR-2)

6. **Park Commission Tree Removal Approval.** Submit to the Planning Division verification of approval from the Park Commission for the removal of trees with a trunk diameter greater than four (4) inches at a point twenty-four (24) inches above the ground) in the front yard setback.

7. **Arborist's Monitoring.** Submit to the Planning Division an executed contract with a qualified arborist for monitoring of all work within the dripline of all native trees and within 30 feet of the dripline of the Moreton Bay Fig Tree at

Chapala Street and Montecito Street. The contract shall include a schedule for the arborist's presence during grading and construction activities, and is subject to the review and approval of the Planning Division.

8. **Letter of Commitment for Pre-Construction Conference.** The Applicant shall submit to the Planning Division a letter of commitment that states that, prior to disturbing any part of the project site for any reason and after the Building and/or Public Works permit has been issued, the General Contractor shall schedule a conference to review site conditions, construction schedule, construction conditions, and environmental monitoring requirements. The conference shall include representatives from the Public Works Department Engineering and Transportation Divisions, the assigned Building Inspector, the Planning Division, the Applicant, the Archaeologist, the Arborist, the Landscape Architect, the Biologist, the Geologist, the Project Engineer, the Project Environmental Coordinator, the Contractor and each subcontractor.

9. **Biology.** A signed contract shall be submitted for the following:

   a. **Biological Monitor.** A qualified biologist (knowledgeable of steelhead and tidewater goby) shall monitor project construction in the water. Monitoring shall be performed at least twice per week beginning when any construction activity is initiated in or above the creek water and occurring every other week until construction in or above the creek water is completed. [BIO-4]

   b. **Invasive Plants.** Invasive weeds (principally giant reed, castor bean, salt cedar, and sweet fennel) shall be removed at least twice a year for the first two years and annually for the next three years following final acceptance of contractor contract completion for each phase of the project. [BIO-10]

   c. **Native Tree Plantings.** Any native trees removed shall be replaced. Any replacement trees which die within the first five years shall be removed and replaced by the same species from 1-gallon stock. The applicant shall maintain the planted vegetation for the life of the project. Said replacement trees shall be propagated from local genetic stock, primarily in lower Mission Creek. [BIO-11]

   d. **Growth Monitoring.** The growth rates of the trees and shrubs planted as a part of this project shall be monitored biannually for five years or until vegetation has been established. If the plants do not meet pre-determined growth and survival rates, actions shall be taken to improve growing conditions such as fertilization, increased irrigation and replanting. Achieve 90% success of the planted vegetation at the end of five years of planting, and ensure that vegetation survival rate is equivalent. If 90% success of the planted vegetation is not achieved after five years, the applicant shall ensure achievement of 90% success of the planted

vegetation. For the first year after completion of construction, the stream bank corridors and habitat expansion zones shall be monitored every three months. At each monitoring period, a monitoring report shall be prepared and a final report shall be prepared at the end of the five year period. Said reports shall be submitted to the Santa Barbara City Community Development Department and the Santa Barbara County Flood Control and Water Conservation District. Monitoring of planted vegetation shall be conducted at least twice a year for a minimum of five years. [BIO-12]

e. **Native vegetation.** At the time contract is awarded, contractor shall initiate propagation of native plant materials collected from the area of the Lower Mission Creek Flood Control project, to the maximum extent feasible. Said material shall be used in each phase of construction. Native plant materials removed from the project area shall be used in project revegetation, to the maximum extent feasible.

10. **15 West Mason Street.** Prior to removal of the building at 15 West Mason Street, full Historic American Building Survey (HABS) recordation, including a photographic study of the structure to the neighborhood and a short history of the building that places it in its historic and architectural context, is required prior to issuance of a demolition permit. [CR-3]

11. **134 Chapala.** If the structure at 134 Chapala is to be removed, complete full HABS documentation, including a photographic study of the relationship of the structure to the neighborhood, and a short history of the building that places it in its historical and architectural context prior to the issuance of a demolition permit. [CR-4]

12. **Waterfront Neighborhood.** Submit the already completed study regarding eligibility of the Waterfront Neighborhood to the City Planning Division. [CR-6] Note that the study has already been completed.

13. **Property Acquisition.** The applicant shall purchase the property interest and provide compensation to the Applicant and tenants and/or property would be relocated as required by State and Federal law. [LU-1]

G. **Permit Requirements.** The Public Works Permit shall require the following measures to be included as requirements in the construction contracts and reproduced on the drawings.

1. **Design Review Requirements.** Plans shall show all design, landscape and tree protection elements, as approved by the Historic Landmarks Commission, outlined in Section C. above.

2. **Prepare a Structural Crack Survey and Video Reconnaissance**. At least twenty (20) days prior to the issuance of a Public Works Permit, Applicant shall notify owners and occupants of structures within 100 feet of the project site

property lines of the opportunity to participate in a structural crack survey and video reconnaissance of their property. Prior to the issuance of a demolition permit, Applicant shall prepare a structural crack survey and video reconnaissance of the property of those owners or occupants who express a desire to participate in the survey. The purpose of the survey shall be to document the existing condition of neighboring structures within 100 feet of the project site property line. After each major phase of project development (demolition, grading, and construction), a follow-up structural crack survey and video reconnaissance of the property of those owners and occupants who have elected to participate in the survey. Prior to issuance of Final Acceptance, Applicant shall meet with the owners and occupants who have elected to participate in the survey to determine whether any structural damage has occurred due to demolition, grading or construction at the project site.

3. **Design.** Implement a design which causes no constriction to the creek bed, and hence no increase of water velocity compared to existing conditions. [BIO-5]

4. **Flow Conditions.** Create flow conditions conducive to the passage of steelhead through the length of the project on Mission Creek. [BIO-6]

5. **Fish Refuges.** Provide permanent refuges appropriate to Tidewater Goby and Steelhead. Restore an important measure of natural heterogeneity in flow characteristics to the riverine portion of the streambed through the creation of boulder fields. Use placement of ledges, grout lines in cast walls, mid-stream boulder clusters, and natural bottom to promote higher quality of in stream habitat, especially during steelhead migration. [BIO-7]

6. **Habitat.** Use strategic placement of boulder clusters on the creek bed as energy dissipaters as determined by a qualified biologist and hydrologist. **[BIO-8]**

7. **Vegetation Establishment**. A temporary, above ground irrigation system shall be installed and maintained for five years to ensure that planted vegetation is established. [BIO-9]

8. **Revegetation Plan.** A final revegetation plan shall be prepared by a qualified biologist that includes the above-stated mitigation measures, indicates how plants and seeds would be collected and grown for the project, and defines success criteria and monitoring in more detail. BIO-13

9. **Potter Hotel Footbridge.** Extend the box culvert downstream of the Chapala Street Bridge as currently designed. [CR-5]

10. **Recreation.** Areas that provide limited passive recreation shall be created where real estate is available. [REC-1]

11. **Fencing/Access.** Provide safety fencing for the public and locations for emergency access. [SAF-1]

12. **Conditions on Plans/Signatures.** The final Planning Commission Resolution shall be provided on a full size drawing sheet as part of the drawing sets. Each condition shall have a sheet and/or note reference to verify condition compliance. If the condition relates to a document submittal, indicate the status of the submittal (e.g., submitted to Public Works Department for review). A statement shall also be placed on the above sheet as follows: The undersigned have read and understand the above conditions, and agree to abide by any and all conditions which is their usual and customary responsibility to perform, and which are within their authority to perform.

Signed:

Applicant		Date
Contractor	Date	License No.
Architect	Date	License No.
Engineer	Date	License No.

H. **Construction Implementation Requirements.** All of these construction requirements shall be carried out in the field by the Applicant and/or Contractor for the duration of the project construction. Community Development Department staff shall review the plans and specifications to assure that they are incorporated into the bid documents, such that potential contractors will be aware of the following requirements prior to submitting a bid for the contract.

1. **Pollution Prevention.** Construction equipment shall be kept in proper working condition and inspected for leaks and drips on a daily basis prior to commencement of work. The construction contractor shall develop and implement a spill prevention and remediation plan and workers shall be instructed as to its requirements. Construction supervisors and workers shall be instructed to be alert for indications of equipment-related contamination such as stains and odors. Construction supervisors and workers shall be instructed to respond immediately with appropriate actions as detailed in the spill prevention and remediation plan if indications of equipment-related contamination are noted. No refueling or oil change shall occur in the creek bed. [HAZ-1]

2. **Unanticipated Archaeological Resources Contractor Notification.** Prior to the start of any vegetation or paving removal, demolition, trenching or grading, contractors and construction personnel shall be alerted to the possibility of uncovering unanticipated subsurface archaeological features or artifacts associated with past human occupation. If such archaeological resources are encountered or suspected, work shall be halted immediately, the City

Environmental Analyst shall be notified and the applicant shall retain an archaeologist from the most current City Qualified Archaeologists List. The latter shall be employed to assess the nature, extent and significance of any discoveries and to develop appropriate management recommendations for archaeological resource treatment, which may include, but are not limited to, redirection of grading and/or excavation activities, consultation and/or monitoring with a Barbareño Chumash representative from the most current City qualified Barbareño Chumash Site Monitors List, etc.

If the discovery consists of possible human remains, the Santa Barbara County Coroner shall be contacted immediately. If the Coroner determines that the remains are Native American, the Coroner shall contact the California Native American Heritage Commission. A Barbareño Chumash representative from the most current City Qualified Barbareño Chumash Site Monitors List shall be retained to monitor all further subsurface disturbance in the area of the find. Work in the area may only proceed after the Environmental Analyst grants authorization.

If the discovery consists of possible prehistoric or Native American artifacts or materials, a Barbareño Chumash representative from the most current City Qualified Barbareño Chumash Site Monitors List shall be retained to monitor all further subsurface disturbance in the area of the find. Work in the area may only proceed after the Environmental Analyst grants authorization. [CR-1]

3. **Tree Protection Buffer:** Install a construction fence as near as possible to the limit of the excavation trench on the Moreton Bay Fig Tree buffer side. No parking or storage of construction equipment shall be allowed in the buffer area. [BIO-18]

4. **Tree Protection Excavation:** All excavation on the channel near the Moreton Bay Fig Tree shall be made from the side of the culvert opposite from the Moreton Bay Fig Tree. [BIO-19]

5. **Tree Protection Mulching:** Prior to the initiation of culvert construction, remove all turf grass between the edge of the excavation trench and the and the drip line of the Moreton Bay Fig Tree and mulch the entire area with two-inch deep composted organic mulch to be approved by the City Arborist. [BIO-20]

6. **Hazardous Materials Contamination.** Prior to construction, borings and soil samples shall be taken at potentially critical areas and analyzed at a qualified laboratory for likely contaminants. If concentrations are detected at or above action levels, remediation action shall be implemented in accordance with federal, state, and county procedures. [HAZ-2]

7. **Sediment Samples.** Prior to the commencement of excavation activities, samples of creek sediments shall be taken to the depth of planned excavation and the same suite of analyses used to characterize the shallow sediments would be used to analyze the deep sediments. In the event actionable concentrations of

contaminants are detected by the analyses, the applicant shall develop a plan to identify the extent of contamination. A plan shall then be developed and implemented to comply with applicable laws and regulations related to the identified contamination so that excavation activities do not result in releases of actionable levels of hazardous materials to the environment. [HAZ-3]

8. **Construction-Related Truck Trips.** Construction-related truck trips that will pass through capacity constrained intersections or peak hour level of service problem areas (as designated in the City's Master Environmental Assessment, p. 99) shall not be scheduled during peak hours (7:00 a.m. to 9:00 a.m. and 4:00 p.m. to 6:00 p.m.), unless approved by the Public Works Director. The purpose of this condition is to help reduce truck traffic on adjacent streets and roadways.

9. **Haul Routes.** The haul route(s) for all construction-related trucks, three tons or more, entering or exiting the staging area or access points, shall be approved by the Public Works Director.

10. **Traffic Control Plan.** All elements of the approved Traffic Control Plan shall be carried out by the Contractor.

11. **Construction Parking/Storage/Staging.** Construction parking and storage shall be provided as follows:

    a. During construction, free parking spaces for construction workers and construction shall be provided at the staging area or in a location subject to the approval of the Public Works Director. Construction workers are prohibited from parking within the public right-of-way, except as outlined in subparagraph b. below.

    b. Parking in the public right of way is permitted as posted by Municipal Code, as reasonably allowed for in the 2006 Greenbook (or latest reference), and with a Public Works permit in restricted parking zones. No more than three (3) individual parking permits without extensions may be issued for the life of the project.

12. **Storage**. Storage or staging of construction materials and equipment within the public right-of-way shall not be permitted, unless approved by the Pubic Works Director.

13. **Dust Control.** Water the excavation site, storage piles and unpaved roads twice each day of construction - once in the morning and at the end of the construction day; and cover material transported in haul trucks. [AQ-1]

14. **Speed.** Limit vehicle speeds to 15 mph maximums within the construction site and maintenance areas. [AQ-2]

15. **Wind Erosion.** Cease grading and earth movement when wind speeds exceed 15 mph, or as directed by SBCAPCD. Storage piles shall be covered to minimize fugitive dust. [AQ-3]

16. **Construction Dust Control. Tarping.** Trucks transporting fill material to and from the site shall be covered from the point of origin.

17. **Construction Dust Control – Gravel Pads.** Gravel pads shall be installed at all access points to prevent tracking of mud on to public roads.

18. **Construction Dust Control – Stockpiling.** If importation, exportation and stockpiling of fill material are involved, soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation.

19. **Construction Dust Control – Disturbed Area Treatment.** After clearing, grading, earth moving or excavation is completed, the entire area of disturbed soil shall be treated to prevent wind pickup of soil. This may be accomplished by:

    a. Seeding and watering until grass cover is grown;

    b. Spreading soil binders;

    c. Sufficiently wetting the area down to form a crust on the surface with repeated soakings as necessary to maintain the crust and prevent dust pickup by the wind;

    d. Other methods approved in advance by the Air Pollution Control District.

20. **Construction Dust Control – Paving.** All roadways, driveways, sidewalks, etc., should be paved as soon as possible. Additionally, building pads should be laid as soon as possible after grading unless seeding or soil binders are used.

21. **Construction Dust Control – PEC.** The contractor or builder shall designate a person or persons to monitor the dust control program and to order increased watering, as necessary, to prevent transport of dust offsite. Their duties shall include holiday and weekend periods when construction work may not be in progress. The name and telephone number of such persons shall be provided to the Air Pollution Control District prior to land use clearance for map recordation and land use clearance for finish grading for the structure.

22. **Diesel Engines.** Heavy-duty diesel-powered construction equipment manufactured after 1996 (with federally mandated "clean" diesel engines) shall be utilized wherever feasible.

23. **Engine Size.** The engine size of construction equipment shall be the minimum practical size.

24. **Amount of Equipment.** The number of construction equipment operating simultaneously shall be minimized through efficient management practices to ensure that the smallest practical number is operating at any one time.

25. **Equipment Maintenance.** Construction equipment shall be maintained in tune per the manufacturer's specifications.

26. **Engine Timing.** Construction equipment operating onsite shall be equipped with two to four degree engine timing retard or pre-combustion chamber engines.

27. **Catalytic Converters.** Catalytic converters shall be installed on gasoline-powered equipment, if feasible.

28. **Certified Pollution Controls.** Diesel catalytic converters, diesel oxidation catalysts and diesel particulate filters as certified and/or verified by EPA or California shall be installed, if available.

29. **Electric Equipment.** Diesel powered equipment should be replaced by electric equipment whenever feasible.

30. **Limited Idling.** Idling of heavy-duty diesel trucks during loading and unloading shall be limited to five minutes; auxiliary power units should be used whenever possible.

31. **Equipment.** To avoid impacts to aquatic resources, no construction equipment shall be operated within the channel and stream bottom between December 1st and March 30th or whenever significant water flows (defined as more than ½" for April and May and more than 1" from June through November) pass down Mission Creek. [BIO-1]

32. **Construction Dates.** To avoid impact to steelhead trout and tidewater goby, which are federally listed species, construction shall be restricted to dates between June I and December 1st if water flow in the CALTRANS Channel [upstream of Yanonali Street within Mission Creek] is more than 1/2 inch deep. If no continuous surface water flow (defined as more than ½" for April and May and more than 1" from June through November) exists in the CALTRANS Channel after April 15th, construction could occur from then until December 1st. Downstream of Yanonali Street, all construction in Mission Creek shall be performed after June 1, provided no significant stream flows are occurring in Mission Creek. [BIO-2]

33. **Construction in the Channel.** No construction shall occur in the flowing water. If water is present during construction, the water shall be diverted by construction of a low flow channel or installation of a pipe as follows:

    a. No construction work is allowed in water in the estuary from December 1 to June 1st

    b. Divide a suitable length of the estuary down the middle with an impermeable barrier, such as sheet piling. The length should be as long as practicable to minimize repetition of this divide and dry procedure for making temporary construction enclosures. A lateral coffer dam in mid-

stream shall not be acceptable because of increased turbidity and fine sediments that would be conveyed downstream to the coastal lagoon.

c. Dam half the estuary at the upper end with sheet piling or equal

d. A qualified biologist shall walk downstream in a zigzag pattern to herd as many fish as possible from the incipient enclosure

e. Dam the lower end of the enclosure with sheet piling or equal immediately.

f. Fish biologists shall seine the entire contained half thoroughly to remove any gobies and other large organisms to the wet side of the construction enclosure.

g. Fish biologists shall monitor the drying enclosure and seine it thoroughly at least twice a week.

h. When construction on one side has been completed, the downstream wall of the enclosure shall be removed first, followed by the upstream end.

i. The above steps shall be repeated for the opposite bank construction. [BIO-3]

34. **Construction Hours**. Construction (including preparation for construction work) is prohibited Monday through Friday before 7:00 a.m. and after 7:00 p.m., and all day on Saturdays, Sundays and holidays observed by the City of Santa Barbara, as shown below:

New Year's Day	January 1st*
Martin Luther King's Birthday	3rd Monday in January
Presidents' Day	3rd Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4th*
Labor Day	1st Monday in September
Thanksgiving Day	4th Thursday in November
Following Thanksgiving Day	Friday following Thanksgiving Day
Christmas Day	December 25th*

*When a holiday falls on a Saturday or Sunday, the preceding Friday or following Monday, respectively, shall be observed as a legal holiday.

When, based on required construction type or other appropriate reasons, it is necessary to do work outside the allowed construction hours, contractor shall contact the Chief of Building and Safety to request a waiver from the above construction hours, using the procedure outlined in Santa Barbara Municipal Code §9.16.015 Construction Work at Night. Contractor shall notify all residents within 300 feet of the parcel of intent to carry out night construction a minimum of 48 hours prior to said construction. Said notification shall include

what the work includes, the reason for the work, the duration of the proposed work and a contact number. [N-1]

35. **Truck Traffic.** Truck traffic shall be limited to designated truck routes, as determined in cooperation with City Transportation Staff. Truck transport shall be permitted between 7 a.m. and 7 p.m., Monday through Saturday and by Condition 8 above that limits construction traffic in impacted intersections during peak traffic times. [N-2]

36. **City Noise Ordinance.** The selected construction contractor shall follow the noise ordinance established by the City of Santa Barbara. [N-3]

37. **Notification.** Property owners and tenants within the project area shall be notified a minimum of 20 days prior to project construction in their area. **[N-4]**

38. **Equipment.** Any equipment that must be operated during nighttime hours must be individually reviewed and treated with enclosures, barriers, silencers or other techniques as required to reduce the noise at any residential property line to 50 dBA. [N-5]

39. **Silencers.** All equipment used in the project shall be equipped with factory standard or better silencing features in proper working condition. [N-6]

40. **Workers.** Worker hearing conservation requirements shall be incorporated into contract documents and implemented. [N-7]

41. **Minimizing Noise Due to Pile Installation**. In order to minimize the amount of noise and vibration generated by pile installation, the preferred method shall be to use push and twist pile installation techniques. However, should pile driving be necessary, the following shall be required:

    a. **Public Exclusion.** If CISS piles are driven with a hammer, members of the public shall be kept out of the 120 dB peak noise level area. The public exclusion area is estimated to be 50 feet from the pile insertion location unless reduced by a three or four sided noise barrier reviewed and approved for adequacy by the noise consultant and the City. If a noise barrier is used, the noise consultant shall specify the reduced estimated distance from the pile insertion that would exceed the 120 dB contour wherein the public would be excluded during pile driving. The public exclusion area shall be clearly demarcated and signed as follows: "WARNING NOISE HAZARD AHEAD, you are advised to avoid the area, use ear protection or stay in this area for less than 30 minutes."

    b. **Barriers.** If CISS piles are inserted, within the area between 50 and 100 feet of the pile insertion point, noise barriers shall be installed that are 8-10 feet high. The barrier design shall be reviewed and approved for adequacy by the noise consultant and the City, and be installed only if the private landowner or business operator consents. In addition, the contactor shall install signs, clearly visible to the public, on all area

roadways approximately 150 feet from the construction area that say "WARNING NOISE HAZARD AHEAD, you are advised to avoid the area, use ear protection or stay in this area for less than 30 minutes." [N-8]

42. **Access/Detours.** No access to residences or commercial establishments shall be eliminated. Appropriate detours and traffic control officers would be provided to direct traffic to alternative routes. Alternative routes, including bicycle routes, shall be coordinated with the City of Santa Barbara, Transportation Division. [TRAN-1]

43. **Safety.** During construction, traffic control officers shall be provided at affected intersections to divert traffic to minimize accidents. [TRAN-2]

44. **Notification** Notify residents and commercial owners of proposed construction in their area at least 20 days before initiation of construction in the vicinity of their neighborhood to advise them of location, time and duration of construction. [TRAN-3]

45. **Damage.** Identify damage caused by construction vehicles and repair damaged facilities. Identify responsible agency or individuals to repair the damaged roads and assure that repair work is completed. [TRAN-4]

46. **Equipment amount, size and speed.** Limit the number and size of vehicles and reduce speed limits. [TRAN-5]

47. **Phases.** Perform project construction in sections as proposed. [TRAN-6]

48. **Notification.** Provide notification to affected landowners prior to disruption of utilities. [UTIL-1]

49. **Dewatering.** The creek channel upstream of construction activity shall be dammed temporarily to prevent water from entering the reach under construction. A diversion pipe shall be installed in the creek to convey any creek water around the construction area for discharge downstream of the construction activity. [WQ-1]

50. **Leaks.** The selected contractor shall develop and implement a spill prevention and remediation plan. [WQ-2]

51. **Time of Construction.** No construction or sediment removal shall occur anywhere within the project area between December 1 and April 15. Construction upstream from the estuary could be accomplished between April 15 and November 30, provided that no continuous surface flow exists. Water flowing deeper than an inch through the CALTRANS Channel (above Yanonali Street) between April 15 and June 1 would require temporary cessation of construction activities in the streambed. [WQ-3]

52. **Turbidity.** Measures to reduce turbidity during the construction of the project and periodic future maintenance shall include installation of pipe, as needed, as

well as creation of low-flow channels around construction and debris removal operations to divert water flow and avoid mixing of loose dust particles into creek flow. Details of these mitigation measures are:

a. Pipe culverts shall be placed in the low flow stream where the stream must be crossed on a regular basis. No work shall be allowed in the flowing water except as absolutely necessary (as determined by the Flood Control District and concerned resource agencies).

b. Construction of temporary low-flow channels within the creek during debris removal operations shall be required to minimize turbidity and provide habitat for aquatic species. The low-flow channel shall be constructed around and away from debris removal operations. Project biologists shall develop criteria for the low-flow channels.

c. Conditions identified in the federal and state permits (Section 404 permit and Section 401 Water Quality Certification and 1601/1603 Streambed Alteration Agreement) shall be followed during construction and future maintenance as applicable. [WQ-4]

53. **Discharges During Maintenance:** • No discharge of oil or spill of contaminated material shall be allowed within the creek bed. [WQ-5]

I. **Maintenance:** The following shall apply to future maintenance of the creek:

1. **Routine Maintenance.** All routine maintenance shall be carried out as follows:

a. Routine maintenance shall be accomplished between August 1st and October 31st. A front end loader or road grader working together with dump trucks (10 cubic yards) would be used for the bulk of sediment and vegetation removal.

b. A pair of silt curtain fences (straw bales) shall be set across the low flow channel not more than 100 yards downstream of the work area; the fences shall be approximately 10 yards apart.

c. Any trout present shall be captured by techniques dictated by National Marine Fisheries Service and California Department of Fish and Game and relocated promptly to a suitable refuge. A written report describing in detail any such relocation shall be submitted to National Marine Fisheries Service.

d. Mechanized equipment shall enter the creek immediately adjacent to the oxbow. A front end loader would scoop all materials directly from the channel to trucks waiting above adjacent to the railroad lines.

e. Sediments and vegetation shall be removed when channel capacity has been reduced by more that 15%. The full width of 33 feet would be cleaned of obstructive materials in the oxbow bypass and would continue to follow current practices. If storm events do not reduce conveyance

more than 15%, then the next maintenance cycle shall involve only mowing of vegetation.

f. During those maintenance cycles when the County determines silt removal has become necessary, all plants and deposits would be removed. As the final step during maintenance, the pilot channel would be rebuilt following the path where the natural channel had gradually come into being, or where the pilot channel was if hydraulic processes have not already shifted and reshaped it. A swath half the channel width shall then be mowed or brushed to suppress the growth of potentially large perennials, first along one side as seems convenient for an arbitrary distance (approx. 250 feet), then switching to the opposite bank for another arbitrary distance, while still allowing for the growth of herbaceous perennials and annuals. The pilot channel would not be disturbed.

g. If sediment removal is not needed the next year, then the other half of the channel shall be mowed and brushed. The pilot channel shall not be disturbed.

h. If storm events of the next winter rains leave enough sediment to warrant their removal, then during the following summer the full width of that section of the creek shall be groomed to remove obstructing sediments and plants. The pilot channel shall be rebuilt where a natural channel had gradually come into being, or where the pilot channel was if hydraulic processes have not already shifted and reshaped it. [BIO-16]

2. **Fish Habitat Maintenance:** Boulder clusters shall be maintained as follows:

a. Sediments shall be removed from among boulder clusters and large rocks of the side baffles only as needed to prevent them from being covered completely.

b. If necessary, sediments shall be dug from the downstream side of boulders with a backhoe equipped with a 3 foot bucket, then dragged toward the center of the creek to be combined with streambed sediments being removed as described previously.

c. Any individual boulders that might have been dislodged mechanically or displaced by currents would be pushed back into a suitable vacant spot in the baffle and reset.

d. Any propagules of giant reed or salt cedar that have taken root shall be eliminated. A combination of foliar application of glyphosate or digging out rhyzomes with hand tools could be employed. Application of herbicides shall be very limited, confined to only those small locations where the most persistent and aggressive weedy plants begin to reinvade the creek bottom.

e. The remaining growth shall be cut back using a brush hog, or similar mowing attachment passed a couple feet over the tops of the rocks. The intent is to cut down woody species before they attain much height or stem expansion, but not to eradicate low-growing herbaceous plants that offer negligible friction to water currents. [BIO-17]

NOTICE OF APPROVAL TIME LIMIT:

This Coastal Development Permit shall be valid as long as the work commences within ten (10) years from the date of approval of the Coastal Development Permit by the Coastal Commission for the portion of the project located within the Coastal Commission's original jurisdiction.

This motion was passed and adopted on the 18th day of September, 2008 by the Planning Commission of the city of Santa Barbara, by the following vote:

AYES: 6 NOES: 0 ABSTAIN: 0 ABSENT: 2 (Bartlett, Jostes)

I hereby certify that this Resolution correctly reflects the action taken by the city of Santa Barbara Planning Commission at its meeting of the above date.

Julie Rodriguez, Planning Commission Secretary

October 16, 2008
Date

THIS ACTION OF THE PLANNING COMMISSION CAN BE APPEALED TO THE CITY COUNCIL WITHIN TEN (10) DAYS AFTER THE DATE THE ACTION WAS TAKEN BY THE PLANNING COMMISSION.

action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary and must be undertaken by the Caltrans for the exemption in section 7(o)(2) to apply. The Caltrans has a continuing duty to regulate the activity covered by this incidental take statement. If the Caltrans (1) fails to assume and implement the terms and conditions or (2) fails to adhere to the terms and conditions of this incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Caltrans must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement (50 CFR §402.14(i)(3)).

A. Amount or Extent of Take

NMFS anticipates the proposed action that will occur in Mission Creek, Santa Barbara County, California, will result in the incidental take of steelhead during capture and relocation activities. NMFS anticipates that no more than 50 steelhead will be captured or collected each year (no more than 100 total), and no more than 3% percent of the total number of steelhead that are captured or collected will be injured or killed as a result of the proposed action.

B. Effect of Take

In the Biological Opinion, NMFS concluded that the anticipated level of take associated with the proposed action is not likely to result in jeopardy to the Southern California ESU of steelhead.

C. Reasonable and Prudent Measures

NMFS believes that the following reasonable and prudent measures are necessary and appropriate to minimize and monitor incidental take of steelhead:

1. The project fisheries biologist will minimize potential impacts to steelhead during onsite project implementation.

2. Implement effective sediment and turbidity control measures.

3. Prevent stream contamination from concrete.

4. Notify NMFS of the work timetable and prepare a monitoring report.

D. Terms and Conditions

In order to be exempt from any prohibitions of section 9 of the ESA, the Caltrans must ensure that the City complies with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary:

NMFS Conditions 2007-08982

EXHIBIT NO. 7
APPLICATION NO.
CDP-08-96/CD-12-09
NMFS / FWS Conditions

1. The following terms and conditions implement reasonable and prudent measure No. 1.

A. The biological monitor shall oversee and/or help implement the water diversion, and shall isolate the work area upstream of the diversion with block netting of mesh size 0.5-inches or less. The biological monitor will also survey the diversion area of the creek for steelhead (including beneath boulders) before diversion takes place, and at least 5 times during the dewatering process and after the diversion is in to make sure no steelhead are stranded in the diversion area before any construction work begins. The biologist shall capture steelhead in the isolated wetted work areas, and then relocate steelhead to a suitable instream location (pool habitat with boulder refuge areas) upstream of the workspace. The biologist shall note the number of steelhead observed in the affected area, the number of steelhead relocated, and the date and time of the collection and relocation. One or more of the following methods shall be used to capture steelhead : seine, dip net, throw net, minnow trap, hand. Electrofishing is prohibited.

B. The biological monitor shall continuously monitor construction activities, instream habitat, and performance of sediment control/detention devices for the purpose of identifying and reconciling any condition that could adversely affect steelhead or their habitat. The biologist shall be empowered to halt work activity and to recommend measures for avoiding adverse effects to steelhead and their habitat. The biological monitor shall contact NMFS (Matt McGoogan, 562-980-4026) immediately for further guidance if any unanticipated problem, which could have an adverse effect on steelhead or critical habitat, occurs.

C. The biologist shall contact NMFS (Matt McGoogan, 562-980-4026) immediately if one or more steelhead are found dead or injured. The purpose of the contact shall be to review the activities resulting in take and to determine if additional protective measures are required, and to discuss procedures to be used to handle or dispose of any dead steelhead. Subsequent notification must also be made in writing to NMFS' Office of Enforcement (telephone: 562-980-4050; 501 W. Ocean Blvd., Suite 4400A, Long Beach, California 90802) within five days of noting dead or injured steelhead. The written notification shall include the date, time, and location of the carcass or injured specimen, a color photograph, cause of injury or death, and name and affiliation of the person who found the specimen.

2. The following terms and conditions implement reasonable and prudent measure No. 2.

A. Sediment collected in erosion control or sediment detention devices (siltation curtains, sandbags, hay bales, etc.) shall be disposed of off-site and will not be allowed to reenter the creek channel.

B. When de-watering of the creek or excavated portions of the creek is necessary, either a pump shall remove water to an upland disposal site, or a siltation basin and/or filtering system shall be used to collect and then return clear water to the creek or ocean, for the purpose of avoiding input of sediment/water slurry into the creek or ocean. Any pump or

filtering system intake shall be fitted with juvenile fish exclusion screens or netting (no larger that 0.25-inch), or similar devices that accomplishes the same purpose.

3. The following terms and conditions implements reasonable and prudent measure No. 3.

A. Any new concrete surfaces that could be exposed to rain or runoff into the stream environment should be isolated from contamination with the stream channel. Caltrans or and City contractors should observe 5-7 day extended forecast weather reports. No fresh concrete shall be utilized for construction in such areas if any rain is forecast to occur within four days.

4. The following terms and condition implements reasonable and prudent measure No. 4.

A. The biological monitor and/or Caltrans shall notify NMFS when the proposed action will take place 5 days prior to the beginning of construction work so NMFS may periodically observe project construction and other activities. These observations may help in devising ways to reduce adverse impacts to steelhead and their habitat for this project and for future projects of similar nature.

B. The biological monitor shall provide a written monitoring report to NMFS within 30 working days following completion of the proposed action. The report shall include the number and size of any and all steelhead relocated, injured or killed during the project action or fish relocation; a description of any problem encountered during the project or when implementing terms and conditions; any effect of the project action on steelhead that was not previously considered; and, photographs of the road crossing and vicinity after project action is complete. The biological monitor shall also provide NMFS with a monitoring report of the revegetation plan after the conclusion of construction and revegetation activities. Reports are to be sent to Matt McGoogan, NMFS, 501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802-4213.

IX. REINITIATION OF CONSULTATION

This concludes formal consultation on the actions outlined in the project proposal. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in this opinion, (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately.

For the tidewater goby, the quantification of take by harassment and mortality is difficult to detect due to the species' small size, aquatic habitat, and annual life history. All of these factors make it difficult to detect where tidewater gobies are present and if any have been affected by an action. For actions covered by this consultation, some harassment and mortality could be directly observed from those captured during translocation efforts; however, mortality from other sources would be difficult to observe. Tidewater gobies may be taken only within the defined boundaries of the work area.

REASONABLE AND PRUDENT MEASURES

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the tidewater goby:

1. The FHWA and Caltrans must ensure that the level of incidental take that occurs during project implementation is commensurate with the analysis contained in this biological opinion.

2. Biologists must be authorized by the Service before they survey for, capture, and move tidewater gobies from the construction area.

The Service's evaluation of the effects of the proposed action includes consideration of the measures to minimize the adverse effects of the proposed action on the tidewater goby. Any subsequent changes in these measures may constitute a modification of the proposed action and may warrant re-initiation of formal consultation, as specified at 50 CFR 402.16. The above reasonable and prudent measures are intended to supplement the protective measures that were proposed by Caltrans and the City as part of the proposed action.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, Caltrans must ensure that the following terms and conditions, which implement the reasonable and prudent measures described above, are implemented:

1. The following term and condition implements reasonable and prudent measure 1:

   Because we are unable to determine with certainty the number of individual tidewater gobies that may be injured or killed, Caltrans and/or the City must notify the Service if more than five individuals are killed or injured. We will then review the project activities to determine if additional protective measures are needed. The cause of death or injury must be determined by a Service-approved biologist. Project activities may continue during this review period, provided that all the terms and conditions of this biological opinion have been, and continue to be, implemented.

FWS
Conditions
1-8-07-F-63

2. The following term and condition implements reasonable and prudent measure 2:

Caltrans and/or the City must request our approval of any biologists they wish to survey for, capture, or relocate tidewater gobies pursuant to this biological opinion. Such requests must be in writing, and be received by the Ventura Fish and Wildlife Office at least 30 days prior to any such activities being conducted. Please be advised that possession of a 10(a)(1)(A) permit for the covered species does not substitute for the implementation of this measure. A section 10(a)(1)(A) recovery permit is limited to any act otherwise prohibited by section 9 of the Act for scientific purposes or to enhance the propagation or survival of the affected species. Authorization of Service-approved biologists is valid for this project only.

REPORTING REQUIREMENTS

Caltrans and/or the City must provide a written report to the Service within 90 days following completion of the proposed project. The report must document the age class (if possible) and number of tidewater gobies relocated from the action area, the date and time of relocation, and a description of relocation sites. The report must also state the number of tidewater gobies killed or injured, and describe the circumstances of the injuries or mortalities if known. The report must contain a brief discussion of any problems encountered in implementing minimization measures, results of biological surveys and sighting records, and any other pertinent information. We encourage you to submit recommendations regarding modification or addition of measures that would maintain or improve protection of the tidewater goby while simplifying compliance with the Act.

DISPOSITION OF DEAD OR INJURED SPECIMENS

Upon locating a dead or injured tidewater goby, initial notification must be made in writing to the Service's Division of Law Enforcement in Torrance, California (370 Amapola Avenue, Suite 114, Torrance, California 90501) and by telephone and writing to the Ventura Fish and Wildlife Office in Ventura, California, (2493 Portola Road, Suite B, Ventura, California 93003, (805) 644-1766) within 3 working days of the finding. The report must include the date, time, location of the carcass, a photograph, cause of death if known, and any other pertinent information.

Care must be taken in handling dead specimens to preserve biological material in the best possible state for later analysis. Should any injured tidewater gobies survive, the Service must be contacted regarding their final disposition. The remains of tidewater gobies must be placed with the Santa Barbara Natural History Museum (Contact: Paul Collins, Santa Barbara Natural History Museum, Vertebrate Zoology Department, 2559 Puesta Del Sol, Santa Barbara, California 93460, 805-682-4711 ext.321).

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to use their authorities to further the purposes

STATE OF CALIFORNIA -- THE RESOURCES AGENCY

ARNOLD SCHWARZENEGGER, *Governor*

CALIFORNIA COASTAL COMMISSION
45 FREMONT STREET, SUITE 2000
SAN FRANCISCO, CA 94105-2219
VOICE AND TDD (415) 904-5200

F 5 a

ADOPTED FINDINGS

ON CONSISTENCY DETERMINATION

Consistency Determination No.	**CD-046-06**
Staff:	MPD-SF
File Date:	6/9/0226
60th Day:	8/8/2006
75th Day:	8/23/2006
Commission Vote:	8/11/2006
Hearing on Findings:	10/15/2006

FEDERAL AGENCY: **U. S. Army Corps of Engineers**

DEVELOPMENT LOCATION: Lower Mission Creek, Santa Barbara (Exhibit 1)

DEVELOPMENT DESCRIPTION: Phase II of Lower Mission Creek flood-control improvements: tidewater goby, flood control channel maintenance, pilot channel design, and landscaping plans (Exhibits 2-9)

PREVAILING COMMISSIONERS: Commissioners Achadjian, Burke, Clark, Neely, Reilly, Vargas, and Chairman Caldwell

SUBSTANTIVE FILE DOCUMENTS: See page 16.

EXHIBIT NO. 8
APPLICATION NO.
CDP-08-96/CD-12-09
CCC Findings

EXECUTIVE SUMMARY

On August 9, 2001, the Commission conditionally concurred with the U. S. Army Corps of Engineers' (Corps') consistency determination for a flood control project to improve flood protection on Mission Creek, in the City of Santa Barbara (CD-117-99). The flood control project was located both within and inland of the coastal zone and consisted of: (1) increasing

the channel capacity to 3400 cubic feet per second (cfs), thereby providing an approximately a 20-year storm level of protection; (2) replacing four bridges along the study reach; (3) installing a new culvert bypassing the oxbow below Highway 101 ("oxbow bypass") (the oxbow would be left in place as a low-flow channel); (4) planting of native riparian species along sloped banks stabilized by riprap and creation of additional riparian habitat by enlarging planted slopes in areas where the Corps must purchase property adjacent to the stream; (5) creek banks consisting of either a vertical wall or a combination vertical wall and riprap sideslope (combination vertical wall/riprap sideslope would consist of vertical wall for the bottom half, with ungrouted riprap for the upper half, and with native riparian vegetation planted within the riprap); (6) maintaining existing natural stream bottom, and restoring concrete lined stream bottom to natural conditions (except immediately underneath bridges and through the oxbow); and (7) fish habitat improvements.

As originally proposed, mitigation measures included: (1) creation of riparian habitat on the banks of the stream; (2) widening the estuary; (3) construction of a pilot channel functioning as a low flow channel for the entire creek above the estuary; (4) instream features improving fish habitat; and (5) seasonal limitations on construction and maintenance activities. The Commission conditioned its concurrence to require the Corps to: (1) prepare and submit to the Commission plans for (a) the pilot channel, (b) maintenance and adaptive-management activities, and (c) landscaping with native riparian vegetation adjacent to the vertical floodwalls in the coastal zone; and (2) accelerate the goby portion of the comprehensive estuary management plan and incorporate relevant recommendations of that portion of the plan into the proposed project. In addition, the Corps agreed to participate in the development of a comprehensive management plan for the estuary and submit a consistency determination for that plan. The Commission found the original flood control project was necessary for flood-control purposes, was the least damaging feasible alternative, included feasible mitigation and, with the mitigation and proposed design, would, as conditioned, protect stream resources, water quality, and environmentally sensitive habitat (including federally listed threatened species - steelhead trout and tidewater goby), scenic views, and archaeological resources.

Under the "phased review" federal consistency procedures,[1] the Corps has submitted a consistency determination for this second phase of the project, consisting of four plans (tidewater goby management, flood control channel maintenance, pilot channel design, and landscaping plans). For this phase, the Corps has submitted the following plans:

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[1] 15 CFR §930.36 (d) provides: *Phased consistency determinations.* In cases where the Federal agency has sufficient information to determine the consistency of a proposed development project or other activity from planning to completion, the Federal agency shall provide the State agency with one consistency determination for the entire activity or development project. In cases where federal decisions related to a proposed development project or other activity will be made in phases based upon developing information that was not available at the time of the original consistency determination, with each subsequent phase subject to Federal agency discretion to implement alternative decisions based upon such information *(e.g.,* planning, siting, and design decisions), a consistency determination will be required for each major decision. In cases of phased decisionmaking, Federal agencies shall ensure that the development project or other activity continues to be consistent to the maximum extent practicable with the management program.

1. Tidewater Goby Management Plan – Lower Mission Creek Flood Control Project, April 2005.

2. Channel Design Recommendations – Lower Mission Creek Flood Control Project, June 2005.

3. Lower Mission Creek Flood Control Project Adaptive Channel Maintenance Plan. Santa Barbara County Flood Control District. June 2005 (This is contained as Appendix C in #2 above).

4. Genetics of *Eucyclogobius newberryi* in Mission Creek Santa Barbara: a regional metapopulation analysis using mitochondrial control region sequence and microsatellites, August 19, 2005. (Supplement to the Tidewater Goby Management Plan).

5. Landscaping Plan, May 2006.

6. Santa Barbara County Streams – Lower Mission Creek, Feasibility Study, Hydraulic Technical Appendix, Sedimentation Engineering, November 1999.

In preparing these plans, the Corps convened the experts needed to analyze the biological, hydrological, water quality, and other specific design issues raised. The pilot channel design plan is based on input from technical experts at the Corps, City, County, University of California, NOAA Fisheries, as well as input from environmental organizations (EDC and Santa Barbara Channel Keeper). The refined plan maximizes feasible fish enhancement features, minimizes (to the extent feasible) artificial walls and stream bottom, includes a pilot channel lined with gravel/cobbles designed to concentrate flows and maintain temperatures beneficial for fish year-round, and provides for continued monitoring and adaptive management, including continuing consultation with the City, County, NOAA Fisheries, and other members of the Channel Design Working Group to monitor and modify the project, if warranted.

The Corps has also included the County's adaptive Channel Maintenance Plan, as the County will be performing the maintenance activities. This plan includes inspection and adoption of methods to protect fish enhancement features of the project, minimizing effects of vegetation removal and channel desilting, minimizing use of herbicides (and continuation of the original "no use of herbicides in the coastal zone" feature), re-creating pilot channels where needed, and removal of non-native vegetation.

The tidewater goby management plan discusses the result of the tidewater goby genetic studies conducted since the Commission's original review, notes the importance of Mission Creek as one of the primary regional "source" estuaries, notes that fish habitat improvements (e.g., baffles, ledges, slower velocities along the perimeter of the lagoon) discussed above will also

benefit gobies, notes that only very limited construction would occur within the estuary itself, contains measures addressing and minimizing impacts from construction impacts on the goby, and provides for continuing goby monitoring.

Measures to protect water quality (including preparation of a storm water pollution prevention plan (SWPPP)), and sediment testing to determine the suitability of maintenance dredging for beach nourishment, have not yet been finalized. Thus, the Corps will still need to provide these details for Commission review and concurrence prior to any construction or maintenance dredging.

Five conditions are necessary to assure consistency with Sections 30236, 30231, 30233, 30240, and 30251 of the Coastal Act, due to the need to: a) avoid misunderstandings over the terms of the Tidewater Goby Management Plan (because several differing drafts had been circulated prior to the Commission's scheduled public hearing); b) clarify future review procedures and monitoring responsibilities; c) memorialize agreements between the Corps, the Commission staff, and the City over avoiding lagoon breaching, planning and implementing an appropriate lagoon buffer zone based on the applicable Coastal Act policies (and including coordination with interested parties); and d) clarify creekside riparian monitoring responsibilities. With the measures included in the revised design, monitoring, maintenance, mitigation, and adaptive management plans, and the on-going review of water quality plans and maintenance dredging, as well as any future project modifications, and as conditioned, the project would protect stream resources, water quality, environmentally sensitive habitat (including steelhead trout and tidewater goby), scenic views, and would therefore be consistent with Sections 30236, 30231, 30233, 30240, and 30251 of the Coastal Act.

STAFF SUMMARY AND RECOMMENDATION:

I. Project Description. The Corps has submitted four plans comprising the second phase of its previously-concurred-with Lower Mission Creek flood-control improvement project (CD-117-99). The overall flood control project is described on pages 4-8 of the attached Commission Findings for CD-117-99 (Exhibit 10). The four plans that are the subject of this consistency determination and are intended to satisfy the four conditions below consist of: (1) a tidewater goby management plan; (2) a flood control channel maintenance plan; (3) a refined pilot channel design; and (4) a landscaping plan. The Commission's conditions of concurrence provided:

> **1.** ***Tidewater Goby Studies, Management Plan and Recommendations:*** *The Corps of Engineers with input from interested biological experts shall conduct Tidewater Goby studies and develop a Management Plan for Tidewater Gobies in the Mission Creek Estuary that evaluates project specific impacts and includes recommendations to minimize those effects. . The Corps shall implement all feasible short- and long-term recommendations in the plan to mitigate impacts associated with the project or intended to lessen project-specific or cumulative impacts to Tidewater Gobies. The Corps shall also make recommendations regarding whether or not to proceed with a Tidewater Goby genetic study to help assess project impacts*

related to potential extirpation and recolonization. In addition, the Corps shall make recommendations regarding allowing the Mission Creek and Laguna Creek estuaries to merge under natural conditions (or as recommended by the team of biologists) in order to benefit Tidewater Gobies. The results of the tidewater goby Management studies and recommendations shall be submitted to the Commission as part of the consistency determination for the design phase review of the Lower Mission Creek Flood Control Project.

2. ***Maintenance Plan:*** *The Corps shall develop a new adaptive creek maintenance plan that includes hand clearing and that minimizes the use of herbicides and heavy equipment. The Maintenance Plan shall be submitted to the Commission as part of the consistency determination for the design phase review of the Lower Mission Creek Flood-Control Project.*

3. ***Pilot Channel Design:*** *The Corps shall develop a new pilot channel configuration for the Lower Mission Creek Flood Control Project. The Corps shall consider, as design alternatives, all feasible suggestions and recommendations on the pilot channel's physical characteristics (e.g., dimensions, morphology, sinuosity, substrate, etc.) received from the Environmental Defense Center, Dr. Ann Riley, Dr. Ed Keller, Dr. Scott Cooper, Dr. Camm Swift, Dr. Kevin Lafferty, National Marine Fisheries Service, and the City and County of Santa Barbara. The new configuration shall be developed with the goal of promoting effective and efficient transport of sediment through the creek, minimizing streambed erosion and sedimentation impacts and related creek maintenance impacts associated with the project, and protecting aquatic habitat. The pilot channel design shall be submitted to the Commission as part of the consistency determination for the design phase review of the Lower Mission Creek Flood Control Project.*

4. ***Landscaping Plan****: The Corps shall develop a new Landscaping Plan that includes native landscaping along all reaches of the project length on both sides of the creek including segments adjacent to vertical floodwalls where vegetated rip-rap banks are not proposed. The Plan shall include provisions for planting on private property to ensure a continuous riparian corridor wherever space physically permits. The Landscaping plan shall be submitted to the Commission as part of the Lower Mission Creek Flood Control Project.*

II. Federal Agency's Consistency Determination. The Corps of Engineers has determined the project consistent to the maximum extent practicable with the California Coastal Management Program.

III. Staff Recommendation.

The staff recommends that the Commission adopt the following motion:

MOTION: I move that the Commission conditionally concur with consistency determination CD-046-06 that the project described therein is fully consistent, and thus is consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program (CCMP).

RESOLUTION TO CONDITIONALLY CONCUR WITH CONSISTENCY DETERMINATION:

The Commission hereby conditionally concurs with the consistency determination CD-046-06 by the Corps of Engineers on the grounds that, if modified as described in the Commission's conditional concurrence, the project would be consistent with the enforceable policies of the CCMP, provided that the Corps of Engineers satisfies the condition specified below pursuant to 15 CFR §930.4.

Conditions:

1. **Lagoon Management Plan.** The Management Actions and other commitments contained in the Tidewater Goby Management Plan – Lower Mission Creek Flood Control Project, dated April 2005, shall be binding on the Corps of Engineers and on any future agencies implementing the management plan, except as provided below. Any changes to the management plan or other actions inconsistent with the Management Actions in the Tidewater Goby Management Plan shall not be implemented unless the Coastal Commission has authorized any such changes or actions through the federal consistency review and/or coastal development permit review process. Any future Corps or agency management plans or projects involving the Mission Creek Lagoon or, to the extent the Laguna Channel is addressed in the Tidewater Goby Management Plan, involving the Laguna Channel estuary shall be coordinated with the Tidewater Goby Management Plan.

2. **Lagoon Breaching Prohibition**. As provided in Management Action 13 A in the above-referenced plan, the Corps of Engineers, the City of Santa Barbara and the County of Santa Barbara shall not breach the lagoon, and to the extent practicable, the Corps shall assure that the City and the County will not artificially breach the lagoon (unless there is an imminent threat to public health and safety, and, in that event, only after the Coastal Commission has reviewed and authorized any such breaching).

3. **Lagoon Buffer.** As provided in Management Action 13 C in the above-referenced plan (also contained in Exhibit 8 of this staff report), the Corps of Engineers (and any future agencies implementing the management plan) shall modify the second sentence as follows: "In addition, the City will establish a 20-50 foot wide buffer zone along

both sides of the lagoon that extends 150-200 feet downstream of the ends of the existing wing walls at the downstream side of the Cabrillo Boulevard bridge (Figure 5 of the above-referenced plan)." Prior to commencement of construction of the flood control project the Corps shall submit the final management plan (including buffers) to the Commission staff for its review and concurrence. The Commission staff will only consider activities which are consistent with the Coastal Act and will involve all known interested parties prior to concurring with the final plan.

4. Landscaping Commitments Adjacent to Mission Creek. Prior to commencement of construction of any portion of the flood control project, the Corps will provide a detailed monitoring plan for the native landscaping to be provided outside the creek bank edges, for Commission staff review and concurrence. The detailed plan shall specify performance and success criteria acceptable to the Coastal Commission, shall specify what incentives are being provided to encourage private landowners to plant and maintain native, non-invasive, trees and shrubs, shall provide for use of local stock wherever possible, shall establish performance and success criteria, shall provide for increasing the incentives in the event monitoring shows that success criteria are not being met, and shall provide that, in the event the Corps is no longer conducting the monitoring, the City or County shall assume all monitoring responsibilities for the life of the project.

5. Water Quality and Habitat Monitoring Plans. Prior to commencement of construction of any portion of the flood control project, the Corps will submit to the Commission staff, for its review and concurrence, all water quality and stormwater protection plans. In addition, all annual monitoring plans for tidewater gobies and steelhead habitat monitoring submitted to the Fish and Wildlife Service and National Marine Fisheries Service shall also be submitted to the Commission staff for its review.

IV. Applicable Legal Authorities.

Section 307 of the Coastal Zone Management Act (CZMA) provides in part:

> *(c)(1)(A) Each Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved State management programs.*

A. Conditional Concurrences.

15 CFR § 930.4 provides, in part, that:

> *(a) Federal agencies, ... agencies should cooperate with State agencies to develop conditions that, if agreed to during the State agency's consistency review period and included in a Federal agency's final decision under Subpart C ... would allow the State*

agency to concur with the federal action. If instead a State agency issues a conditional concurrence:

(1) The State agency shall include in its concurrence letter the conditions which must be satisfied, an explanation of why the conditions are necessary to ensure consistency with specific enforceable policies of the management program, and an identification of the specific enforceable policies. The State agency's concurrence letter shall also inform the parties that if the requirements of paragraphs (a)(1) through (3) of the section are not met, then all parties shall treat the State agency's conditional concurrence letter as an objection pursuant to the applicable Subpart...

(2) The Federal agency (for Subpart C) ... shall modify the applicable plan [or] *project proposal, ... pursuant to the State agency's conditions. The Federal agency ... shall immediately notify the State agency if the State agency's conditions are not acceptable; and ...*

(b) If the requirements of paragraphs (a)(1) through (3) of this section are not met, then all parties shall treat the State agency's conditional concurrence as an objection pursuant to the applicable Subpart.

15 CFR § 930.34 (d) and (e) elaborate, providing that:

(d) ... At the end of the ... [statutory time] period the Federal agency shall not proceed with the activity over a State agency's objection unless: (1) the Federal agency has concluded that under the "consistent to the maximum extent practicable" standard described in section 930.32 consistency with the enforceable policies of the management program is prohibited by existing law applicable to the Federal agency and the Federal agency has clearly described, in writing, to the State agency the legal impediments to full consistency (See §§930.32(a) and 930.39(a)), or (2) the Federal agency has concluded that its proposed action is fully consistent with the enforceable policies of the management program, though the State agency objects.

(e) If a Federal agency decides to proceed with a Federal agency activity that is objected to by a State agency, or to follow an alternative suggested by the State agency, the Federal agency shall notify the State agency of its decision to proceed before the project commences.

B. <u>Consistent to the Maximum Extent Practicable.</u>

Section 930.32 of the federal consistency regulations provides, in part, that:

(a)(1) The term "consistent to the maximum extent practicable" means fully consistent with the enforceable policies of management programs unless full consistency is prohibited by existing law applicable to the Federal agency.

The Commission recognizes that the standard for approval of Federal projects is that the activity must be "consistent to the maximum extent practicable" (Coastal Zone Management Act Section 307(c)(1)). This standard allows a federal activity that is not fully consistent with the CCMP to proceed, if compliance with the CCMP is "*prohibited [by] existing Federal law applicable to the Federal agency's operations*" (15 C.F.R. § 930.32). the Corps of Engineers did not provide any documentation to support a maximum extent practicable argument in its consistency determination. Therefore, there is no basis to conclude that existing law applicable to the Federal agency prohibits full consistency.

V. Findings and Declarations:

The Commission finds and declares as follows:

A. Stream Alteration and Environmentally Sensitive Habitat. The Coastal Act provides:

> **Section 30236.** *Channelizations, dams, or other substantial alterations of rivers and streams shall incorporate the best mitigation measures feasible, and be limited to (l) necessary water supply projects, (2) flood control projects where no other method for protecting existing structures in the floodplain is feasible and where such protection is necessary for public safety or to protect existing development, or (3) developments where the primary function is the improvement of fish and wildlife habitat.*
>
> **Section 30233**
>
> *(a) The diking, filling, or dredging of open coastal waters, wetlands, estuaries, and lakes shall be permitted in accordance with other applicable provisions of this division, where there is no feasible less environmentally damaging alternative, and where feasible mitigation measures have been provided to minimize adverse environmental effects, and shall be limited to* [eight specified uses]*:* ...
>
> ***Section 30240***
>
> *(a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
>
> *(b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

As discussed in its findings on the original consistency determination for this flood control project (Exhibit 10)(hereby incorporated by reference), the Commission found that the flood control project was an allowable use for stream alteration and fill, was the least environmentally damaging feasible alternative, included adequate monitoring and mitigation,

and would benefit the stream resources by widening of the stream and estuary and removal of artificial hard bottom in the estuary and stream. The Commission conditioned its concurrence to address any remain impacts to stream resources (see pages 4-5 above for condition language). Aside from these conditions, during the Commission's original review, the Corps had also incorporated a number changes into the project, as follows:

1. Pursuant to section 930.36(d) of the regulations that implement the CZMA, the Corps will submit to the Commission one or more additional consistency determinations for future phases of the project and the maintenance thereof. In the future consistency determination(s), the Corps will 1) describe the specific characteristics of the design, and 2) consider all design-related issues including design of the pilot channel, adaptive management plan, and maintenance plan.

2. The Corps will convene a team of biologists with expertise on the tidewater goby. The team will consider issues related to the management of the tidewater goby within Mission Creek. Among other issues, the team will discuss the need for a study of tidewater goby genetics. If there are regional benefits and the team recommends proceeding with the study, the team will define the scope, parameters and protocols to be followed.

3. The Corps will perform additional hydraulic analyses to investigate the feasibility and effectiveness of raising the State Street and Cabrillo Boulevard Bridges independently or together. The Corps will submit to the Commission and EDC [the Environmental Defense Center] results of these analyses.

4. The Corps will compile the adaptive management and maintenance plan into a single document and will present the document to the Commission upon completion. In that plan, the Corps will clarify the methods for maintenance (e.g., herbicide and heavy equipment vs. hand clearing of vegetation).

5. The Corps will submit to the Commission as part of a consistency determination for a future phase of this project 1) a final design for the pilot channel, and 2) analysis that supports the Corps' final design choice. This analysis will reflect the fact that the current (feasibility level) characteristics and functions are not necessarily appropriate to optimal fluvial behavior for sediment transport and conveyance through Lower Mission Creek.

6. The Corps will participate with the City of Santa Barbara in the development of a management plan for the Mission Creek estuary, which will include an analysis of tidewater goby habitat as part of the overall plan along with water quality, flood control concerns, aesthetics, safety, and recreational opportunities. The Corps will submit to the Commission a consistency determination for this comprehensive management plan.

7. The Corps will accelerate the goby portion of the comprehensive estuary management plan as part of the proposed flood-control project. This goby plan will consider, among other issues, the commingling of the Laguna Channel and Mission Creek at the estuary. To the extent feasible, the Corps will implement recommendations from the plan that are associated with the flood-control project.

In compliance with the above commitments and Commission conditions, the Corps has convened the experts needed to analyze the biological, hydrological, water quality, and other specific design and has submitted the results of these more refined analyses, in the form of a tidewater goby management plan, a flood control channel maintenance, a refined pilot channel design, and landscaping plans. The pilot channel design plan is based on input from technical experts at the Corps, City, County, University of California, NOAA Fisheries, as well as input from environmental organizations (EDC and Santa Barbara Channel Keeper). The refined plan includes: (1) unlined stream bottom (except under existing bridges); (2) wider openings at four bridges; (3) widened stream sections, including (a) 2,200 ft. of widening from Canon Perdido to Haley St. (from 25 ft. to 42 ft), 1000 ft. from Haley St. to Highway 101 (25 ft. to 50 ft.), and 1,100 ft. from Yanonali St to the Beach (27 ft. to 60 ft.); (4) removal of existing concrete bottom; (5) installation of riprap lining to protect bridges from scour due to increased widths; (6) construction of a pilot channel lined with gravel/cobbles designed to concentrate flows and maintain temperatures beneficial for fish year-round; (7) placement of clusters of boulders as rock energy dissipaters; (8) installation of fish ledges and fish baffles to provide fish protection and resting areas (particularly for steelhead); (9) consideration of measures to reduce the extent of riprap; and (10) an adaptive management program including consultation with the City, County, NOAA Fisheries, and other members of the Channel Design Working Group to monitor and modify the project, if warranted, including adding or removing weirs, modifying the size of instream boulders, placing additional boulders to encourage formation of a more stable and deeper low flow channel and series of pools. (See Exhibit 7 for further recommendations, details and mitigation measures the Corps has agreed to implement.)

The Corps' submittal also includes the County's adaptive Channel Maintenance Plan, as the County will be performing the maintenance activities. This plan includes inspection and adoption of methods to protect fish enhancement features of the project, minimizing effects of vegetation removal and channel desilting, minimizing use of herbicides (and continuation of the original "no use of herbicides in the coastal zone" feature), re-creating pilot channels where needed, and removal of non-native vegetation (see Exhibit 9 for further details and mitigation measures).

The tidewater goby management plan, which is a combined City, County, and Corps proposal, discusses the result of the tidewater goby genetic studies conducted since the Commission's original review and notes the importance of Mission Creek as one of the primary regional "source" estuaries (i.e., for repopulation to other estuaries) for tidewater gobies in southern Santa Barbara County, due to its relatively large size and long history of goby occupation, larger tidal reach, and longer upstream accessibility. The management plan also notes fish habitat improvements (e.g., baffles, ledges, slower velocities along the perimeter of the lagoon) discussed above will also benefit gobies, which are poor swimmers and need refuge during high flow events. The plan notes that, as discussed above, limited construction (primarily repair of damaged channel walls) would occur within the estuary itself. The plan contains measures addressing construction impacts on the goby and proposes the following measures to protect gobies:

(1) limit construction in the estuary to avoid the peak spawning season (i.e., limit construction to June 15-Dec. 15);
(2) separate construction areas from the estuary using cofferdams and leave at least half the estuary (upstream of Cabrillo Blvd.) watered at all times;
(3) remove gobies using seine netting supervised by a qualified biologist and replace them in undisturbed portions of the estuary;
(4) conduct pre- and post-constriction goby monitoring;
(5) float intake pumps to the maximum extent possible to minimize effects on gobies;
(6) use 1/8 inch or smaller mesh size for intake pump and frequently monitor mesh; and
(7) provide annual reports to the U.S. Fish and Wildlife Service analyzing effects on gobies and recommending any needed modifications.

The Plan also reflects the Corps' agreement to implement the recommendations from its "goby genetics" study, including: (a) assuring no construction will occur in Arroyo Burro during construction at Mission Creek (Arroyo Burro is located upcoast (and west) of Mission Creek and is one of the other regionally critical goby habitat areas); (b) maintaining Mission Creek and Laguna Channels as separate channels during construction; and (c) creating a small artificial lagoon "a modest distance down the beach" and populating it with gobies "until well after construction is complete."

Exhibit 8 provides a complete list of the tidewater goby Management Objectives, Management Actions for the Design Phase, Construction Phase, and Post-construction Phase, Other Actions/Lagoon Management, including limiting estuary breeching, allowing the Mission Creek and Laguna Channel lagoons to merge, planting stabilizing native vegetation, and placement of interpretive signs, monitoring and developing plans for enhancing tidewater goby recolonization after any "extirpation" events, and, finally, a Monitoring and Adaptive Management Program.

In order to find the proposed project consistent with Sections 30236, 30231, 30233, 30240, and 30251 of the Coastal Act, the Commission finds that several conditions are necessary due to the need to: (a) avoid misunderstandings over the terms of the Tidewater Goby Management Plan (in part because several differing drafts had been circulated prior to the Commission's scheduled public hearing); (b) clarify future review procedures and monitoring responsibilities; (c) memorialize agreements between the Corps, the Commission staff, and the City over avoiding lagoon breaching, planning and implementing an appropriate lagoon buffer zone based on the applicable Coastal Act policies and including coordination with interested parties; and (d) clarify creekside riparian monitoring responsibilities.

To address these concerns, the conditions on pages 7-8 are intended to: (a) clarify which version of the Tidewater Goby Management Plan is the agreed-upon plan; (b) clarify that any changes to the plan will necessitate further Commission review; (c) clarify that any Laguna Channel plans are coordinated with the Tidewater Goby Management Plan; (d) clarify that artificial lagoon breaching is prohibited (except under emergencies, and even then only with Commission authorization); (e) reflect an agreement to amend the lagoon buffer provisions of

the Tidewater Goby Management Plan to provide for a 20-50 ft. buffer on *both* sides of the lagoon; (f) provide for submittal of the final management plan (including buffers) to the Commission staff for its review and concurrence, which review will involve all known interested parties, and which will only consider activities which are consistent with the Coastal Act (including the habitat, wetland and stream alteration policies, and public access and recreation policies, and, if any conflicts should occur, the conflict resolution provisions of Section 30007.5 of the Coastal Act); (g) provide for Commission staff review of the riparian landscaping plan outside the creekbed, including plans and ongoing monitoring responsibilities; and (h) provide for Commission staff review of the water quality plans and monitoring.

With the measures included in the revised design, monitoring, maintenance, mitigation, and adaptive management plans, and the on-going review of water quality plans and maintenance dredging, as well as any future project modifications, and as conditioned, the Commission finds the project would protect stream resources, water quality, environmentally sensitive habitat (including steelhead trout and tidewater goby), scenic views, and would therefore be consistent with Sections 30236, 30231, 30233, 30240, and 30251 of the Coastal Act.

B. <u>Water Quality</u>. Section 30231 of the Coastal Act provides:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

In its original review the Commission found:

> *The proposed flood-control facility provides the Corps with an opportunity to restore water quality resources in Mission Creek by incorporating appropriate measures or technologies into the project design to reduce non-point source pollution. The reconstruction of the flood-control facility, including the replacement of bridges, installation of a culvert under Highway 101, and construction of floodwalls, provide the Corps with an opportunity to design the facility to incorporate measures into the project in order to reduce non-point source pollution. Section 30231 of the Coastal Act requires the restoration of water quality resources where feasible. However, based on discussions with water quality experts within the Commission staff and Santa Barbara County, it is undesirable to install non-point source pollution treatment devices at the storm drain outfall into the flood-control channel because*

> *that location makes maintenance of the treatment device more problematic.*[2] *It seems preferable to place the treatment devices away from the creek where it is more accessible for maintenance purposes. In addition, the City of Santa Barbara is applying for a Phase II Stormwater NPDES to address non-point source pollution and the City has other programs to address water quality. Finally, the Corps has agreed that prior to construction it will coordinate with the City's water quality staff to determine if any of the activities proposed by the City could be coordinated with the flood-control project. With these measures, the project is consistent with the water quality policies of the Coastal Act.*
>
> *In conclusion, the Commission finds that the proposed project will not significantly affect water quality resources of the coastal zone. Specifically, the project provides for water quality protection measures for construction and maintenance of the flood-control channel. Additionally, the Corps will coordinate its construction activities with the City's non-point source pollution program to avoid redundant construction efforts and increasing construction efficiency. Therefore, the Commission finds that the proposed project is consistent with the water quality policies of the CCMP.*

Measures to protect water quality in the original project included: (1) no vegetation removal or herbicide use in the coastal zone; (2) use of silt curtains and mosaic vegetation removal where such activities occur inland of the coastal zone boundary; (3) coordinating the construction of the flood-control facility with the water quality efforts within the City of Santa Barbara, so that, if necessary and advantageous, the City could construct measures to control appropriate non-point source pollution concurrent with the project; and (4) preparation of a storm water pollution prevention plan (SWPPP) to minimize water quality impacts from the construction of the flood-control facility, to be subject to further Commission consistency review (both the SWPPP and the maintenance plan). Final water quality plans have not been included in this second phase of the submittal; thus, the Corps will still need to provide these details for Commission review and concurrence prior to any construction. The Commission reiterates its previous water quality conclusion that, with the opportunity to review the final SWPPP/water quality plans, the five conditions are necessary to assure consistency with Sections 30236, 30231, 30233, 30240, and 30251 of the Coastal Act the project is consistent with the water quality policy (Section 30231) of the Coastal Act.

C. <u>Sand Supply.</u> Section 30233(d) of the Coastal Act provides for the use of suitable material removed from coastal streams to be used for beach replenishment purposes. This section provides that:

> *Erosion control and flood control facilities constructed on water courses can impede the movement of sediment and nutrients which would otherwise be carried by storm runoff into coastal waters. To facilitate the continued delivery of these sediments to the littoral zone, whenever feasible, the material removed from these facilities may be placed at appropriate points on the shoreline in accordance with other applicable*

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[2] Personal Communication, Santa Barbara County, 3/29/01. [footnote in original]

> *provisions of this division, where feasible mitigation measures have been provided to minimize adverse environmental effects. Aspects that shall be considered before issuing a coastal development permit for such purposes are the method of placement, time of year of placement, and sensitivity of the placement area.*

In its original review the Commission noted that maintenance activities including removal of sediment from the stream should be tested prior to excavation to determine if it is suitable for beach disposal. The Commission noted that the final EIS for the proposed project did not include an evaluation of the suitability of this material for beach replenishment. Without this information, the Commission was unable to determine if sediment disposal activities would adversely affect coastal resources, but since the Corps agreed to provide this information at a later phase, like the water quality plans, the Commission determined the proper procedures were in place to enable beach replenishment where appropriate. The Commission therefore concluded that "With the commitments for phased consistency review and use of suitable material for beach replenishment purposes, the Commission finds that the proposed project is consistent with the sand supply policies of the Coastal Act." This information is still unavailable; thus, like the water quality issue discussion contained in the previous section, sediment analysis and beach replenishment options will need to be reviewed at a later phase when the information becomes available. The Commission reiterates its previous sand supply conclusion that, with the opportunity to review the final sediment test results and disposal proposals, the project is consistent with the sand supply policy (Section 30233(d)) of the Coastal Act.

D. <u>Visual Resources</u>. Section 30251 of the Coastal Act provides, in part, that:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas....*

The Commission previously found:

> *As stated above, most of the Creek within the coastal zone will be developed with vertical walls and will not appear as a natural stream. However, most of the stream within the coastal zone (approximately 85%) is already developed with some manmade structures. The remaining portion of the stream within the coastal zone still has some natural appearance. The proposed project will change that appearance of the entire stream within the coastal zone to a channelized hardened stream. Despite this change in character, the Corps believes that the project will improve the visual character of the creek. This conclusion is based on several factors: 1) the project will remove trash and debris from the creek and project fences will make it more difficult to dispose of trash in the stream; 2) the project will remove buildings that are immediately adjacent to the creek (in some cases the walls of the buildings are the banks of the stream); 3) removal of several different types of existing bank treatments that have already adversely affected the stream's visual quality; and 4) the floodwalls will be constructed out of sandstone which will be more*

aesthetically pleasing than the current bank treatments and the project will include planting of vegetation that will also improve the visual quality of the stream. Finally, through the PED consistency review, the Commission will be able to ensure that the final design will protect and improve visual resources. Therefore, the Commission finds that the proposed project is consistent with the view protection policies of the Coastal Act.

The Corps's submittal includes several measures providing both habitat benefits, as described above, as well as aesthetic improvements. The landscaping proposal (Exhibits 5-6) provides for planting, monitoring, and maintaining native riparian habitat within the creek, planting riparian habitat within Corps'- and City-controlled areas adjacent to the creek banks, providing incentives for private landowners to plant additional riparian habitat adjacent to the creek banks, monitoring the landscaping plans to assure they meet identified success criteria, removing concrete from the creek bottom (except under four bridges), and the above-discussed designs for floodwalls that, to the degree possible, mimic a natural creek bank. With the measures included in the revised design, monitoring, maintenance plans, and as conditioned, the Commission finds that the project would improve scenic public views and be consistent with the visual resource protection policy (Section 30251) of the Coastal Act.

VI. Substantive File Documents:

1. Consistency Determination CD-117-99, Army Corps, Mission Creek Flood Control Project.

2. Landscape Plan, Lower Mission Creek Flood Control Project, U.S. Army Corps of Engineers and City of Santa Barbara, April 2006.

3. Genetics of *Eucyclogobius newberryi* in Mission Creek Santa Barbara: a regional metapopulation analysis using mitochondrial control region sequence and microsatellites. Prepared for Army Corps of Engineers 8/19/05, D. K. Jacobs, K. D. Louie, D. A. Earl, C. Bard, C.Vila & C.C. Swift, Department of Ecology & Evolution, UCLA.

4. Santa Barbara County Streams – Lower Mission Creek, Feasibility Study Hydraulic Technical Appendix, Sedimentation Engineering, Army Corps of Engineers November 1999.

5. Final Environmental Impact Statement/Environmental Impact Report and Feasibility Study for Lower Mission Creek Flood Control Project, Santa Barbara, California, September 2000.

6. Biological Assessments, Lower Mission Creek Flood Control Project, Santa Barbara, California, December 1999.

7. Draft Fish and Wildlife Coordination Act Report, Lower Mission Creek Flood Control Project, Santa Barbara, California, U.S. Fish and Wildlife Service, September 1999.

8. Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara, County California, National Marine Fisheries Service, August 2, 2000.

9. Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara, County California, U.S. Fish and Wildlife Service, June 1, 2001.

2. Final Environmental Impact Statement/Environmental Impact Report for Lower Mission Creek Flood Control Project, Santa Barbara, California, September 2000.

3. Biological Assessments, Lower Mission Creek Flood Control Project, Santa Barbara, California, December 1999.

4. Draft Fish and Wildlife Coordination Act Report, Lower Mission Creek Flood Control Project, Santa Barbara, California, U.S. Fish and Wildlife Service, September 1999.

5. Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara, County California, National Marine Fisheries Service, August 2, 2000.

6. Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara, County California, U.S. Fish and Wildlife Service, June 1, 2001.

STAFF SUMMARY AND RECOMMENDATION:

I. Project Description.

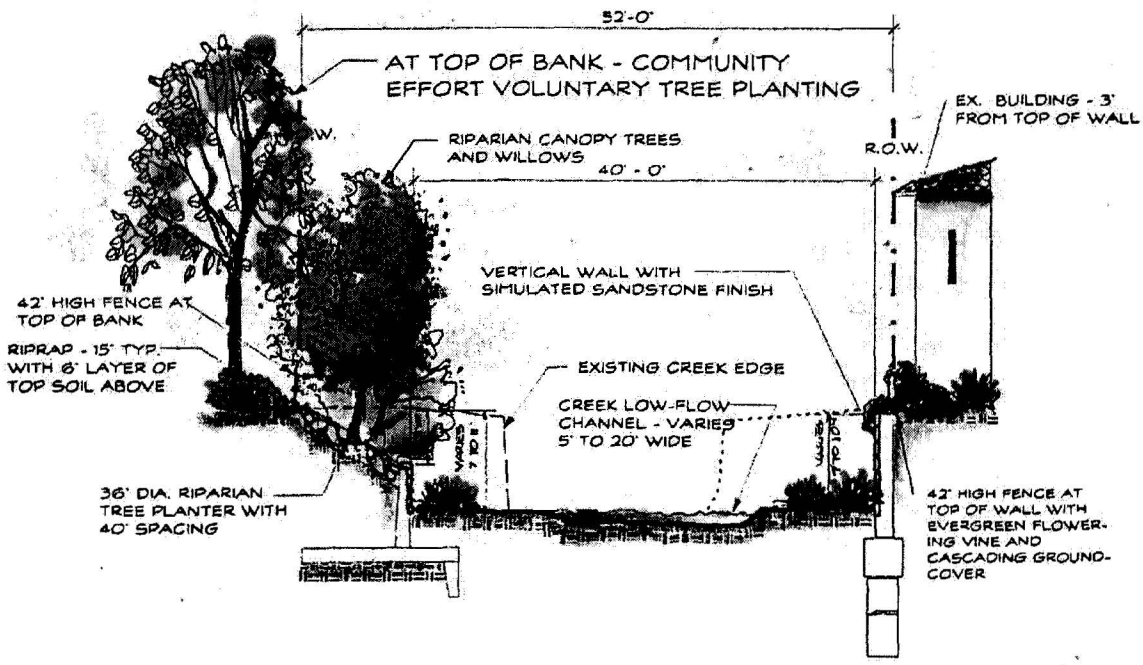
The Corps proposes to develop a flood-control facility on Mission Creek in Santa Barbara with a capacity of 3,400 cfs (existing capacity is 1,500 cfs) and will thereby provide approximately a 20-year storm level of protection. Four bridges along the study reach will be replaced. Additionally, the project includes a new culvert bypassing the oxbow upstream of Highway 101 ("oxbow bypass"). The culvert will cross the highway, Montecito Street, and the railroad tracks before rejoining the creek upstream of the Chapala Street Bridge. The culvert will be covered only across Montecito Street down to its confluence at Chapala Street Bridge, which will consist of two concrete boxes (12 ft x 10.5 ft). The open portion of the culvert beginning upstream of Highway 101 will be a 25-foot-rectangular concrete channel. The open channel will be approximately 200 linear feet, while the concrete box culvert will be approximately 350 feet in length. The oxbow will be left in place as a low flow channel.

The project includes planting of native riparian species along sloped banks stabilized by riprap, creation of 0.6 acres of riparian habitat adjacent to the oxbow, and enlargement of sloped planting areas. Land acquisitions will provide for the widening of the creek and creation of habitat expansion zones at several locations (as many as six) along Lower Mission Creek. The habitat expansion zones will be planted with trees native to coastal California. Species planted may include western sycamore (*Platanus racemosa*), cottonwood (*Populus fremontii*), coast live oak (*Quercus agrifolia*), California laurel (*Umbellularia califo*[illegible] myrtle (*Myrica california*), hollyleaf cherry (*Prunus ilicifolia*), and white [illegible] (*Alnus rhombifolia*).

EXHIBIT NO. 9
APPLICATION NO.
CDP-08-96/CD-12-09

The creek banks will consist of either a vertical wall or a combination vertical wall and riprap sideslope. The combination bank treatment will consist of vertical wall for the bottom half, while ungrouted riprap (15 inches thick) at a 1.5:1 (Vertical to Height ratio) slope will form the upper half. The height of the vertical wall in this combination design will vary along the entire length of the project area. Riprap will be overlain on a layer of native rock and soil, with topsoil distributed through the interstices of the riprap, and covered with 9 inches of prepared topsoil. Concrete pipes of varying sizes (up to a maximum three feet in diameter) will be placed in between the riprap to allow planting of native trees and vegetation. Several species of riparian trees, including western sycamore, cottonwood, and coast live oak will be planted from one gallon nursery stock into cylindrical planters embedded within the riprap and spaced 40 feet apart.

Rendering of short floodwalls with vegetated riprap[1]



VEGETATED SIDE SLOPE AND VERTICAL WALL SECTION VIEW

NOT TO SCALE

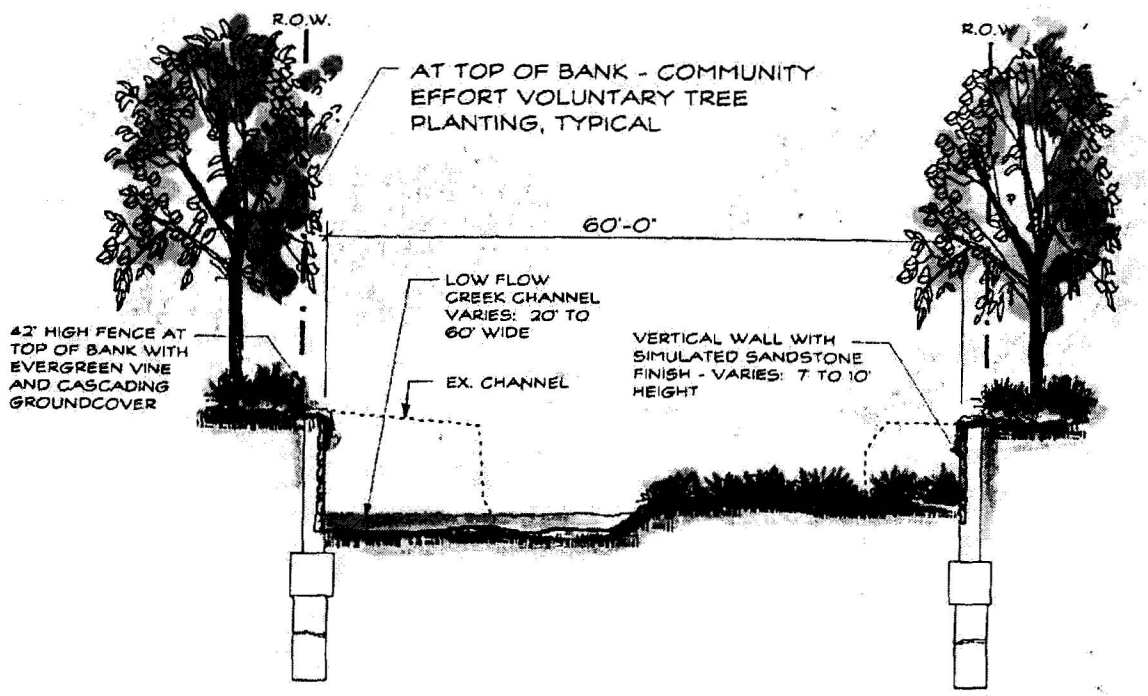
Willow branches will be placed into prepared soil below the riprap in dense rows with the expectation that approximately 20% will sprout vegetatively and find their way through gaps in the riprap. Other native understory species, including

[1] City of Santa Barbara, Letter Dated 2/22/00

arroyo willow (*Salix lasiolepis*), Mexican elderberry (*Sambucus mexicana*), and coyote brush (*Baccharis pilularis*), will be seeded into the topsoil, or set out from liner stock.

Combination riprap and vertical wall will be the dominant bank treatment upstream of Highway 101, except in two short reaches just upstream of Haley-De la Vina Bridge and De la Guerra Bridge. Below Highway 101, the combination riprap and vertical wall will be applied along the southeast bank, starting from midpoint between Chapala Bridge and Mason Bridge down to midpoint between Mason Bridge and State Bridge and between the State Street bridge and the Cabrillo Street Bridge. In total, about 4,275 feet of Mission Creek will be finished with this combination design. However, most of the stream banks in the coastal zone will consist of vertical walls.

Rendering of Vertical Flood walls[2]



VERTICAL WALL ON PIER FOOTING
TYPICAL SECTION

NOT TO SCALE

Existing natural stream bottom will be maintained and stream bottom that is now concrete lined will be restored to natural conditions, except for immediately

[2] City of Santa Barbara, Letter Dated 2/22/00

underneath bridges and through the oxbow. Restoration to natural bottom will necessitate excavation and removal of one to four feet of streambed in the reach between De la Guerra Street bridge and Ortega Street Bridge, one to three feet of streambed between Ortega Street Bridge and Bath Street Bridge, two to three feet of streambed between Cota Street Bridge and Haley-De la Vina Bridge, and two to four feet of streambed between Haley-De la Vina Bridge and Gutierrez Street Bridge. In the reach between Chapala Street Bridge and State Street Bridge, there will be excavation and/or fill of one foot of streambed. In the final reach of Lower Mission Creek from State Street Bridge to Cabrillo Boulevard Bridge, the streambed will be cleared of leftover footings from earlier structures. There will be no flood-control improvements in the Mission Creek lagoon, south of Cabrillo Boulevard. Additionally, the project will include measures to improve fish habitat within the stream. These measures include placement of boulder clusters as energy dissipaters and provide some heterogeneity to the stream. Additionally, the project includes construction of a low-flow channel inland of the coastal zone, fish ledges and baffles and Goby refugia (hideouts) constructed along the flood-control walls.

Finally, the proposed project provides for annual maintenance of the flood-control facility. The maintenance activities include removal of sediment and vegetation from the streambed inland of the coastal zone, inspection and repairing, as needed, the channel wall, overflow culvert and weir structure, monitoring and repairing the vegetated rip rap areas and habitat expansion zones, and repairing interior drainage structures (storm drains). The vegetation removal will occur in a mosaic pattern that requires removal of vegetation from half the stream with the other half being cleared in the following year. Thus, the removal of vegetation from any one part of the stream will occur every other year. This consistency determination does not include vegetation or sediment removal in the coastal zone as part of the maintenance program.

At the hearing for this project, the Corps incorporated the following changes into the project:

1. Pursuant to section 930.36(d) of the regulations that implement the CZMA, the Corps will submit to the Commission one or more additional consistency determinations for future phases of the project and the maintenance thereof. In the future consistency determination(s), the Corps will 1) describe the specific characteristics of the design, and 2) consider all design-related issues including design of the pilot channel, adaptive management plan, and maintenance plan.

2. The Corps will convene a team of biologists with expertise on the tidewater goby. The team will consider issues related to the management of the tidewater goby within Mission Creek. Among other issues, the team will discuss the need for a study of tidewater goby genetics. If there are regional

benefits and the team recommends proceeding with the study, the team will define the scope, parameters and protocols to be followed.

3. The Corps will perform additional hydraulic analyses to investigate the feasibility and effectiveness of raising the State Street and Cabrillo Boulevard Bridges independently or together. The Corps will submit to the Commission and EDC results of these analyses.

4. The Corps will compile the adaptive management and maintenance plan into a single document and will present the document to the Commission upon completion. In that plan, the Corps will clarify the methods for maintenance (e.g., herbicide and heavy equipment vs. hand clearing of vegetation).

5. The Corps will submit to the Commission as part of a consistency determination for a future phase of this project 1) a final design for the pilot channel, and 2) analysis that supports the Corps' final design choice. This analysis will reflect the fact that the current (feasibility level) characteristics and functions are not necessarily appropriate to optimal fluvial behavior for sediment transport and conveyance through Lower Mission Creek.

6. The Corps will participate with the City of Santa Barbara in the development of a management plan for the Mission Creek estuary, which will include an analysis of tidewater goby habitat as part of the overall plan along with water quality, flood control concerns, aesthetics, safety, and recreational opportunities. The Corps will submit to the Commission a consistency determination for this comprehensive management plan.

7. The Corps will accelerate the goby portion of the comprehensive estuary management plan as part of the proposed flood-control project. This goby plan will consider, among other issues, the commingling of the Laguna Channel and Mission Creek at the estuary. To the extent feasible, the Corps will implement recommendations from the plan that are associated with the flood-control project.

II. Status of Local Coastal Program.

The standard of review for federal consistency determinations is the policies of Chapter 3 of the Coastal Act, and not the Local Coastal Program (LCP) of the affected area. If the Commission certified the LCP and incorporated it into the CCMP, the LCP can provide guidance in applying Chapter 3 policies in light of local circumstances. If the Commission has not incorporated the LCP into the CCMP, it cannot guide the Commission's decision, but it can provide background information. The Commission has partially incorporated the City of Santa Barbara LCP into the CCMP.

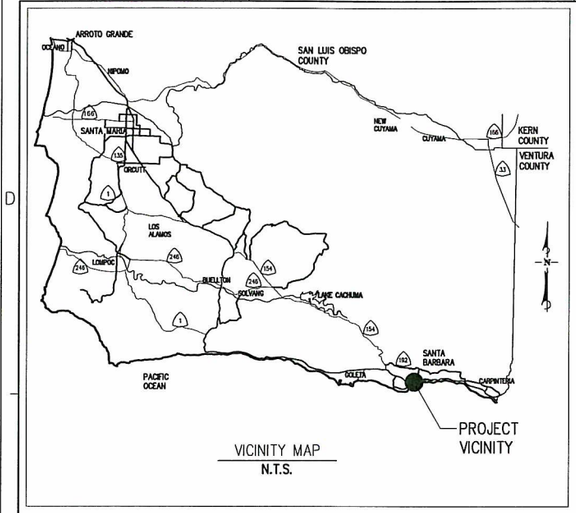
III. Federal Agency's Consistency Determination.

APPENDIX **5**

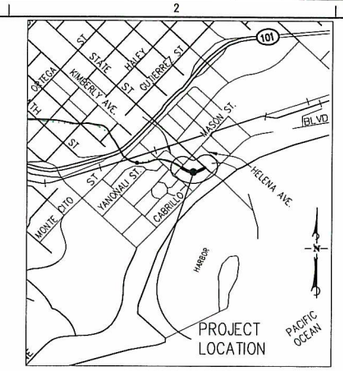
100% Design Plans for Reach 1A, Phase 2 and 60% Design Plans for Reach 1B

LOWER MISSION CREEK

FLOOD CONTROL PROJECT
U.S. ARMY CORPS OF ENGINEERS
FOR
CITY OF SANTA BARBARA
SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
REACH 1A – STATE ST. TO MASON ST.
PHASE 2



VICINITY MAP
N.T.S.



LOCATION MAP
N.T.S.

LEGEND

- PROPOSED CHANNEL WALL
- FUTURE CHANNEL WALL
- MERGED PARCEL BOUNDARY
- EASEMENT LINE
- RIGHT OF WAY
- PROPOSED RIPRAP TOE
- PROPERTY LINE
- STRUCTURES TO BE DEMOLISHED
- STRUCTURES TO BE PROTECTED
- TEMPORARY SECURITY FENCE
- CONTRACTOR'S ACCESS & STAGING AREA
- CATCH BASIN
- CATCH BASIN
- FIRE HYDRANT
- IRRIGATION CONTROL VALVE
- METER
- MANHOLE
- OBSERVATION MONITORING WELL
- POWER POLE
- PULLBOX
- STREET LIGHT
- WATER VALVE

CIP – CAST IRON PIPE
VCP – VITRIFIED CLAY PIPE
ABAN. – ABANDONED
CMP – CORRUGATED METAL PIPE
PE – POLYETHYLENE
DI – DROP INLET
ELEC. – ELECTRIC
FL – FLOWLINE
GV – GAS VALVE
INV – INVERT
ICV – IRRIGATION CONTROL VALVE
LP – LIGHT POLE
PB – PULL BOX
RCP – REINFORCED CONCRETE PIPE
SCO – SEWER CLEAN OUT
SD – STORM DRAIN
SMH – SEWER MANHOLE
TEL – TELEPHONE
VLV – VALVE
VLT – VAULT
WM – WATER METER
EG – EXISTING GROUND
HGL – HYDRAULIC GRADIENT LINE
EGL – ENERGY GRADIENT LINE

S – UNDERGROUND SEWER
W – UNDERGROUND WATER
G – UNDERGROUND GAS
OHW – OVERHEAD WIRE
E – UNDERGROUND ELECTRIC
SD – UNDERGROUND STORM DRAIN
SL – UNDERGROUND STREET LIGHT (ELEC.)
T – UNDERGROUND TELEPHONE
AW – UNDERGROUND ABANDONED WATER
FOC – UNDERGROUND FIBER OPTIC CABLE
TR – UNDERGROUND TRAFFIC SIGNAL (ELEC.)
AS – UNDERGROUND ABANDONED SEWER
CTV – UNDERGROUND CABLE TV
EXISTING LIGHT

GENERAL NOTES

1. RIGHT AND LEFT BANKS ARE LOOKING DOWNSTREAM.

2. ON THIS SET OF DRAWINGS THE DIRECTION OF FLOW IS SHOWN FROM LEFT TO RIGHT AS YOU FACE THE DRAWING.

DEMOLITION NOTES

3. PIPING: REMOVE ALL PIPING IN THE DEMOLITION AREA, INCLUDING UNDERGROUND PIPING, EXPOSED PIPING, OR PIPING FIXED TO TIMBER STRUCTURES, TO THE PROPERTY LINE.

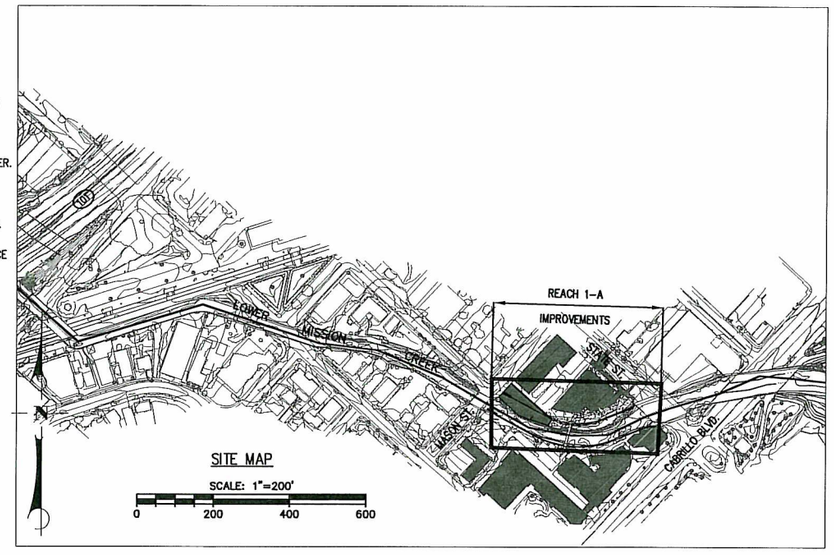
4. ELECTRICAL AND TELEPHONE LINES: REMOVE ELECTRICAL CONDUIT, FIXTURES AND EQUIPMENT FROM THE DEMOLITION AREA, TO THE PROPERTY LINE.

5. WATER LINES: REMOVE AND CAP WATER AND OTHER UTILITY LINES IN ACCORDANCE WITH APPLICABLE CODES, TO THE PROPERTY LINE.

6. STORM DRAINS: REMOVE CATCH BASINS IN THE DEMOLITION AREA, INCLUDING OUTFALL PIPING THROUGH THE BULKHEAD. REMOVE CITY OUTFALL STRUCTURES AND TRIM PIPE TO CLEAR NEW CONSTRUCTION.

CONSTRUCTION NOTES

1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D-4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST PILES BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS-SECTION 72; ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. CONSTRUCT 42" HAND RAIL, SEE SH.D-2.
5. CONSTRUCT 6' HIGH TEMPORARY SECURITY WOODEN (DOUGLAS FIR) FENCE AND GATES ALONG THE DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREAS AS APPROVED BY THE OWNER.
6. DEMOLISH AND REMOVE. PULL EXISTING PILES & LAGGING. SEE SH.C-2.
7. PROTECT IN PLACE
8. CONSTRUCT 30"x24" REINFORCED BOND BEAM AS PER DETAILS ON SH.D-4.
9. CONSTRUCT #3 SPIRAL STEEL CAGE WITH 3" PITCH. TOP OF SPIRAL SHALL BE 6" BELOW TOP OF PILE. BOTTOM OF SPIRAL SHALL BE 6" ABOVE BOTTOM OF PILE
10. PLACE BOND BREAKER BETWEEN THE END OF THE BOND BEAM AND ANY EXISTING CONCRETE SURFACE
11. INSTALL BOULDER CLUSTER. BOULDER SIZE 200+ POUND



SITE MAP
SCALE: 1"=200'
0 200 400 600

SURVEY MAPPING NOTES

1. MAPPING

TOPOGRAPHIC MAPPING WAS COMPILED AT A SCALE OF 1"=200', WITH A 1 FOOT CONTOUR INTERVAL, USING STANDARD PHOTOGRAMMETRIC METHODS AND PROCEDURES BY ARROWHEAD MAPPING CORPORATION, FROM AERIAL PHOTOGRAPHY DATED MAY 5, 2003.

MAPPING IS SUPPLEMENTED BY DATA COLLECTED IN A FIELD SURVEY USING CONVENTIONAL METHODS AND PROCEDURES IN JUNE 2003 AND IN APRIL 2010 BY PENFIELD & SMITH, AND IN AUGUST 2003 BY JOHNSON FRANK & ASSOCIATES.

AERIAL PHOTOGRAPHY

THE AERIAL PHOTOGRAPHY USED AS THE BACKGROUND FOR THIS MAP WAS OBTAINED ON MAY 5, 2003 BY ARROWHEAD MAPPING CORPORATION, THE PHOTOGRAPHY HAS BEEN CONVERTED INTO A DIGITAL FORMAT AND CORRECTED FOR HORIZONTAL AND VERTICAL DISTORTION USING STANDARD PHOTOGRAMMETRIC METHODS.

2. BASIS OF BEARINGS AND COORDINATES

BEARINGS SHOWN ON THIS MAP ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM, NAD 83, ZONE 5 GRID (EPOCH 1991.35), DEFINED LOCALLY BY THE SANTA BARBARA CONTROL NETWORK AS SHOWN ON RECORD OF SURVEY FILED WITH THE COUNTY SURVEYOR IN BOOK 147 PAGES 70-74. DISTANCES AND COORDINATES SHOWN AS MEASURED OR CALCULATED ARE EXPRESSED IN CCS, NAD 83, ZONE V GRID US SURVEY FOOT UNITS.

3. ELEVATIONS

ELEVATIONS SHOWN HEREON ARE EXPRESSED IN U.S. SURVEY FEET AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), DEFINED LOCALLY BY THE SANTA BARBARA CONTROL NETWORK AS SHOWN ON RECORD OF SURVEY FILED WITH THE COUNTY SURVEYOR IN BOOK 147 PAGES 70-74.

UTILITIES:
THE EXISTING UTILITIES SHOWN HEREON HAVE BEEN COMPILED FROM ATLAS MAPS OBTAINED FROM THE FOLLOWING PUBLIC AND PRIVATE ENTITIES:

ELECTRIC – SOUTHERN CALIFORNIA EDISON COMPANY
GAS – SOUTHERN CALIFORNIA GAS COMPANY
CATV – COX COMMUNICATIONS
TELEPHONE COMMUNICATIONS – VERIZON
FIBER OPTIC CABLE – AT&T
FIBER OPTIC CABLE – U.S. SPRINT
FIBER OPTIC CABLE – MCI NETWORK SERVICES INC.
WATER – CITY OF SANTA BARBARA
SEWER – CITY OF SANTA BARBARA
STORM DRAIN – CITY OF SANTA BARBARA

COMPILED UTILITIES HAVE BEEN GEOREFERENCED TO VISIBLE SURFACE UTILITIES LOCATED BY SAID AERIAL MAPPING AND SUPPLEMENTAL FIELD SURVEYS.

THE CONTRACTOR SHALL VERIFY THE LOCATIONS, ACCURACY, AND COMPLETENESS OF INFORMATION OBTAINED FROM SAID ATLAS MAPS.

BENCHMARK

BM1 FOUND STANDARD USC&GS BRASS TIDAL STATION DISK (DESIGNATION 941 1340 TIDAL 1) STAMPED "BM 1 1930" NEAR THE INTERSECTION OF HELENA AVENUE AND EAST CABRILLO BLVD., SET IN THE TOP OF THE NE'LY END OF A 4' HIGH CONC. GUARDRAIL OF THE BRIDGE OVER MISSION CREEK, 52.5, SE'LY OF THE CENTERLINE OF CABRILLO BLVD. ELEVATION = 4.921 METERS NAVD88.

UNDERGROUND SERVICE ALERT

1-800-227-2600

TWO (2) WORKING DAYS BEFORE YOU DIG ARTICLE 2, SECTION 4216 OF THE GOVERNMENT CODE REQUIRES A DIG ALERT IDENTIFI- CATION NUMBER BE ISSUED BEFORE A "PERMIT TO EXCAVATE" WILL BE VALID. FOR YOUR DIG ALERT I.D. NUMBER CALL UNDERGROUND SERVICE ALERT AT THE NUMBER ABOVE.

INDEX TO SHEETS

FILE	SH.#	DESCRIPTION
221-108	G-1	TITLE SHEET, KEY MAP, VICINITY MAP
221-109	C-1	PROJECT LIMITS, EXISTING AND PROPOSED EASEMENTS AND TEMPORARY RIGHT OF ENTRY
221-110	C-2	DEMOLITION PLAN
221-111	C-3	SEQUENCE OF CONSTRUCTION WORK
221-112	C-4	PLAN AND PROFILES
221-113	C-5	CHANNEL CROSS SECTIONS
221-114	D-1	PLAN & DETAILS – PROPOSED WALLS UNDER EXISTING PEDESTRIAN BRIDGE
221-115	D-2	PLAN & DETAILS AT STATE ST. BRIDGE AND ELADIO'S PATIO
221-116	D-3	PLAN & DETAILS AT MASON ST. BRIDGE
221-117	D-4	SECANT PILE WALL DETAILS
221-118	D-5	PLAN & DETAILS – WALL RETURNS
221-119	D-6	PLAN & DETAILS – STORM DRAIN CATCH BASIN #1 & #2
221-120	D-7	PLAN & DETAILS – FISH LEDGES
221-121	D-8	DETAILS – BOND BEAM, HANDRAIL & SHOTCRETE TEXTURE
221-122	B-1	CONE PENETROMETORS, BOREHOLES LOGS LOCATION PLAN
221-123	B-2	BOREHOLES LOG
221-124	B-3	BOREHOLES LOGS AT STATE ST. BRIDGE
221-125	B-4	REPORTED PETROLEUM CONTAMINATED AREA – PLATE 5
221-126	B-5	REPORTED PETROLEUM CONTAMINATED AREA – PLATE 6
221-127	B-6	REPORTED PETROLEUM CONTAMINATED AREA – PLATE 7
221-128	B-7	WALL TRANSITION PLAN
221-129	T-1	TRUCK ROUTING PLAN

ABBREVIATIONS USED

SBCFCD – SANTA BARBARA COUNTY FLOOD CONTROL DISTRICT
SPPWC – STANDARD PLANS FOR PUBLIC WORKS CONSTRUCTION
BP – BEGIN POINT
EP – END POINT
PC – POINT OF CURVE
PT – POINT OF TANGENT
BC – BEGIN CURVE
EC – END CURVE
PCC – POINT OF COMPOUND CURVE
ROW – RIGHT OF WAY
FS – FINISHED SURFACE

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
TITLE SHEET, KEY MAP, VICINITY MAP
CITY OF SANTA BARBARA, CALIFORNIA

PREPARED BY:
DEAN RYAN
CONSULTING ENGINEERS, INC.
723 South Figueroa Street, Suite 3320
Los Angeles, California 90017
Tel 213.687.1130
Fax 213.687.1139

DESIGNED BY: RSW
DRAWN BY: WMM
CHECKED BY: MHB
DATE:

LOS ANGELES CORPS OF ENGINEERS
U.S. ARMY ENGINEER DISTRICT

THIS DESIGN IS ACCEPTED BY THE LOS ANGELES DISTRICT OF THE U.S. ARMY CORPS OF ENGINEERS. THE INITIALS OR SIGNATURES AND REGISTRATION DESIGNATIONS OF INDIVIDUALS APPEAR ON THESE PROJECT DOCUMENTS WITHIN THE SCOPE OF THEIR EMPLOYMENT AS REQUIRED BY E.R. 1110-1-8152. SIGNATURE'S AFFIXED HEREON INDICATE OFFICIAL RECOMMENDATION AND APPROVAL OF ALL THE DRAWINGS IN THE SET.

APPROVED: DATE:
CHIEF, ENGINEERING DIVISION

FILE NAME: 1910GBS01-#1

SUBMITTED BY: DATE:
CHIEF, DESIGN BRANCH

SPEC. NO.

PREPARED UNDER THE DIRECTION OF:
COL. R.MARK TOY
DISTRICT ENGINEER

DISTRICT FILE NO. 221/108

SCALE AS SHOWN

SHEET 1 OF 22 SHEETS

SHEET INDEX NO. G-1

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

DEPUTY DIRECTOR, PUBLIC WORKS DATE

CITY OF SANTA BARBARA
APPROVED:

CITY ENGINEER DATE

ORIGINAL SIGNED DATE

PUBLIC WORKS DEPARTMENT ENGINEERING DIVISION

PLANS PREPARED UNDER THE SUPERVISION OF

MADHUSOODAN H. BHATT
REGISTERED CIVIL ENGINEER

DATE:
R.C.E. NO: 21699
EXP: 09/30/2011

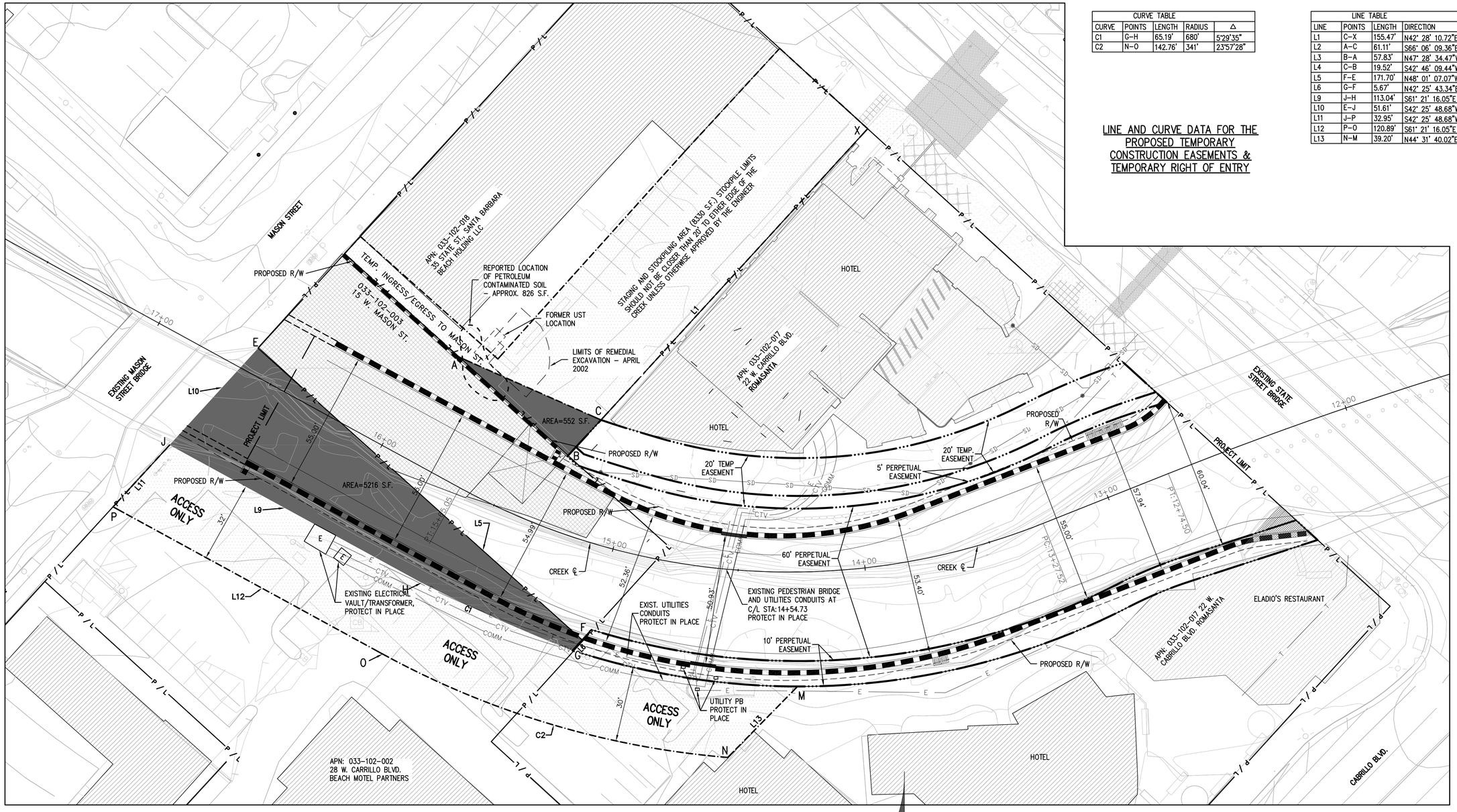
REGISTERED PROFESSIONAL ENGINEER
MADHUSOODAN H. BHATT
No. C 021699
Exp. 09/30/2011
CIVIL
STATE OF CALIFORNIA

11/3/2010 4:30:52 PM

CURVE TABLE				
CURVE	POINTS	LENGTH	RADIUS	Δ
C1	G–H	65.19'	680'	5°29'35"
C2	N–O	142.76'	341'	23°57'28"

LINE TABLE			
LINE	POINTS	LENGTH	DIRECTION
L1	C–X	155.47'	N42° 28' 10.72"E
L2	A–C	61.11'	S66° 06' 09.36"E
L3	B–A	57.83'	N47° 28' 34.47"W
L4	C–B	19.52'	S42° 46' 09.44"W
L5	F–E	171.70'	N48° 01' 07.07"W
L6	G–F	5.67'	N42° 25' 43.34"E
L9	J–H	113.04'	S61° 21' 16.05"E
L10	E–J	51.61'	S42° 25' 48.68"W
L11	J–P	32.95'	S42° 25' 48.68"W
L12	P–O	120.89'	S61° 21' 16.05"E
L13	N–M	39.20'	N44° 31' 40.02"E

LINE AND CURVE DATA FOR THE PROPOSED TEMPORARY CONSTRUCTION EASEMENTS & TEMPORARY RIGHT OF ENTRY



LEGEND

- PROPOSED CHANNEL WALL
- FUTURE CHANNEL WALL
- MERGED PARCEL BOUNDARY
- EASEMENT LINE
- RIGHT OF WAY
- PROPOSED RIPRAP TOE
- PROPERTY LINE
- STRUCTURES TO BE DEMOLISHED
- STRUCTURES TO BE PROTECTED
- NOT USED
- CONTRACTOR'S ACCESS & STAGING AREA
- TEMPORARY RIGHT OF ENTRY LINE
- PROPOSED AREA TO BE ACQUIRED FOR ADDITIONAL PERMANENT EASEMENTS

EXISTING AND PROPOSED EASEMENTS – PLAN

SCALE: 1"=20'

0 20 40 60

N

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2 – PROJECT LIMITS, EXISTING AND PROPOSED EASEMENTS AND TEMPORARY RIGHT OF ENTRY
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERED BY: DEAN RYAN CONSULTANTS & DESIGNERS, INC. 777 South Figueroa Street, Suite 3320 Los Angeles, California 90017 Tel 213.687.1139 Fax 213.687.1139

DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: COL. R.MARK TOY, CHIEF, DESIGN BRANCH

FILE NAME: 1910CSP01–#2

DISTRICT FILE NO. 221/109 SPEC. NO.

SCALE AS SHOWN

SHEET 2 OF 22 SHEETS

C–1

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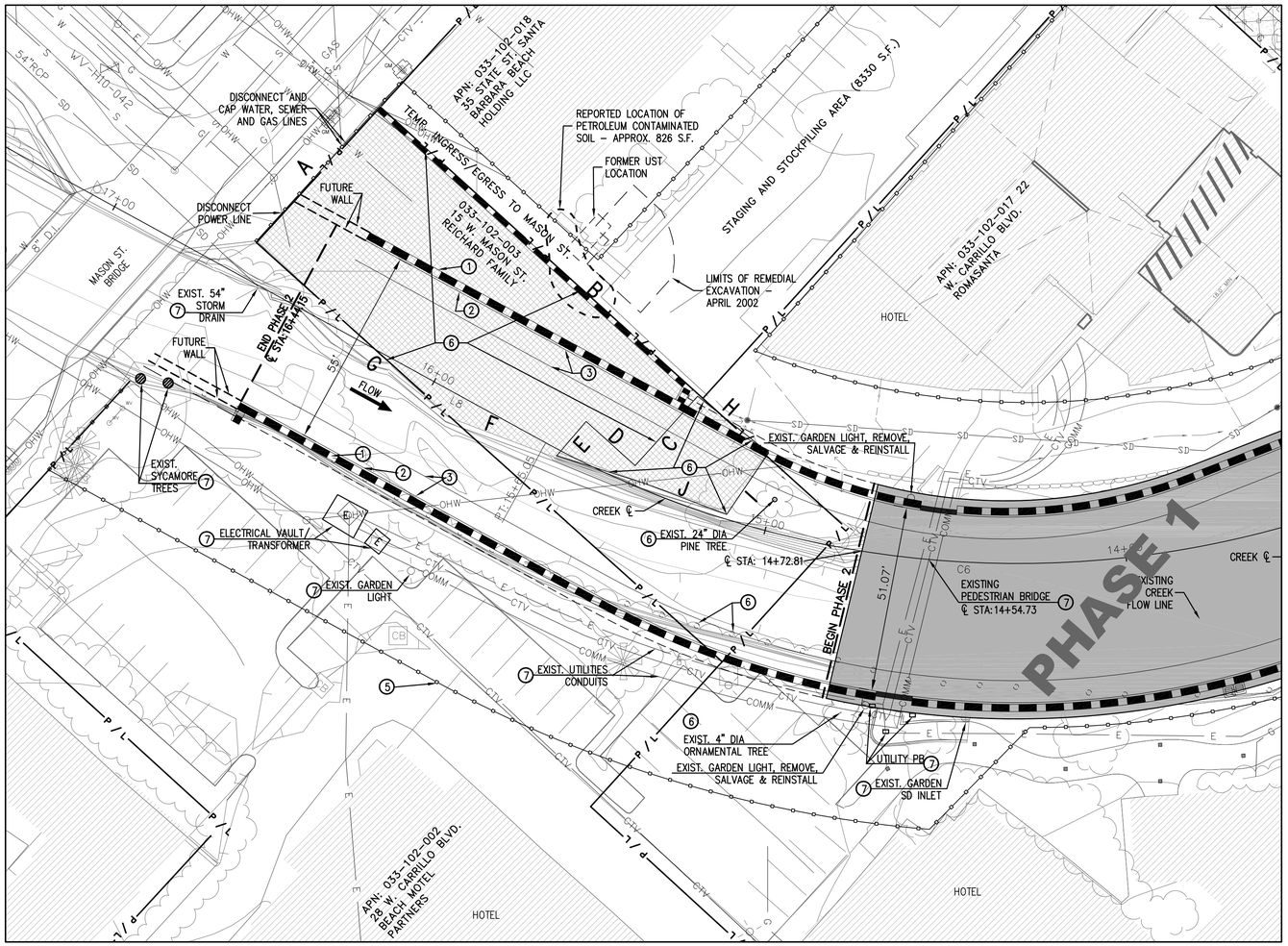

PHASE 2 – DEMOLITION PLAN

SCALE: 1"=20'

0 20 40 60

LEGEND

- PROPOSED CHANNEL WALL
- FUTURE CHANNEL WALL
- MERGED PARCEL BOUNDARY
- NOT USED
- RIGHT OF WAY
- PROPOSED RIPRAP TOE
- PROPERTY LINE
- STRUCTURES TO BE DEMOLISHED
- STRUCTURES TO BE PROTECTED
- TEMPORARY SECURITY FENCE
- CONTRACTOR'S ACCESS & STAGING AREA

CONSTRUCTION NOTES

1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D-4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST PILES BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS–SECTION 72; ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. NOT USED
5. NOT USED
   DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREAS AS APPROVED BY THE OWNER.
6. DEMOLISH AND REMOVE. PULL EXISTING PILES & LAGGING. SEE SH.C-2.
7. PROTECT IN PLACE
8. CONSTRUCT 30"x24" REINFORCED BOND BEAM AS PER DETAILS ON SH.D-4.

NOTE: DEMOLITION AND REMOVAL OF THE BUILDING AT NO. 15 W. MASON STREET

THE BUILDING AT NO. 15 W. MASON STREET IS A ONE STORY BUILDING. THE BUILDING IS TO BE DEMOLISHED INCLUDING THE FLOOR AND FOUNDATIONS AND REMOVED FOR DISPOSAL. THE ENTIRE SITE IS TO BE COMPLETELY CLEARED OF ALL ABOVE GROUND AND BELOW GROUND STRUCTURES, UTILITIES AND UNDERGROUND PIPES. SEWER AND WATER LINES ARE TO BE DISCONNECTED AND CAPPED OR PLUGGED IN ACCORDANCE WITH THE CITY OF SANTA BARBARA REQUIREMENTS. TELEPHONE AND ELECTRIC LINES AND ANY OTHER UTILITY CONNECTIONS WILL BE TERMINATED AND DISCONNECTED IN ACCORDANCE WITH THE UTILITY REQUIREMENTS, AND THEY WILL BE REMOVED FROM THE SITE TO THE PROPERTY LINE.
THE COUNTY OF SANTA BARBARA HAS A SOIL MANAGEMENT PLAN FOR HANDLING AND REMOVAL OF CONTAMINATED SOIL.

DIMENSIONS OF DEMOLISHED STRUCTURES

15 W. MASON ST. – BUILDING AREA 5328 S.F.
PATIO AREA 815 S.F.

LINE	LENGTH
A	50'
B	118'
C	26'
D	18'
E	13'
F	31'
G	72'
H	25'
I	20'
J	50'

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
DEMOLITION PLAN
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERD BY:
DEAN RYAN
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Los Angeles, California 90017
Tel 213.687.1139
Fax 213.687.1139

DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 1910CSP02-#3

DISTRICT FILE NO. 221/110
SPEC. NO.

SCALE AS SHOWN
SHEET 3 OF 22 SHEETS
C-2

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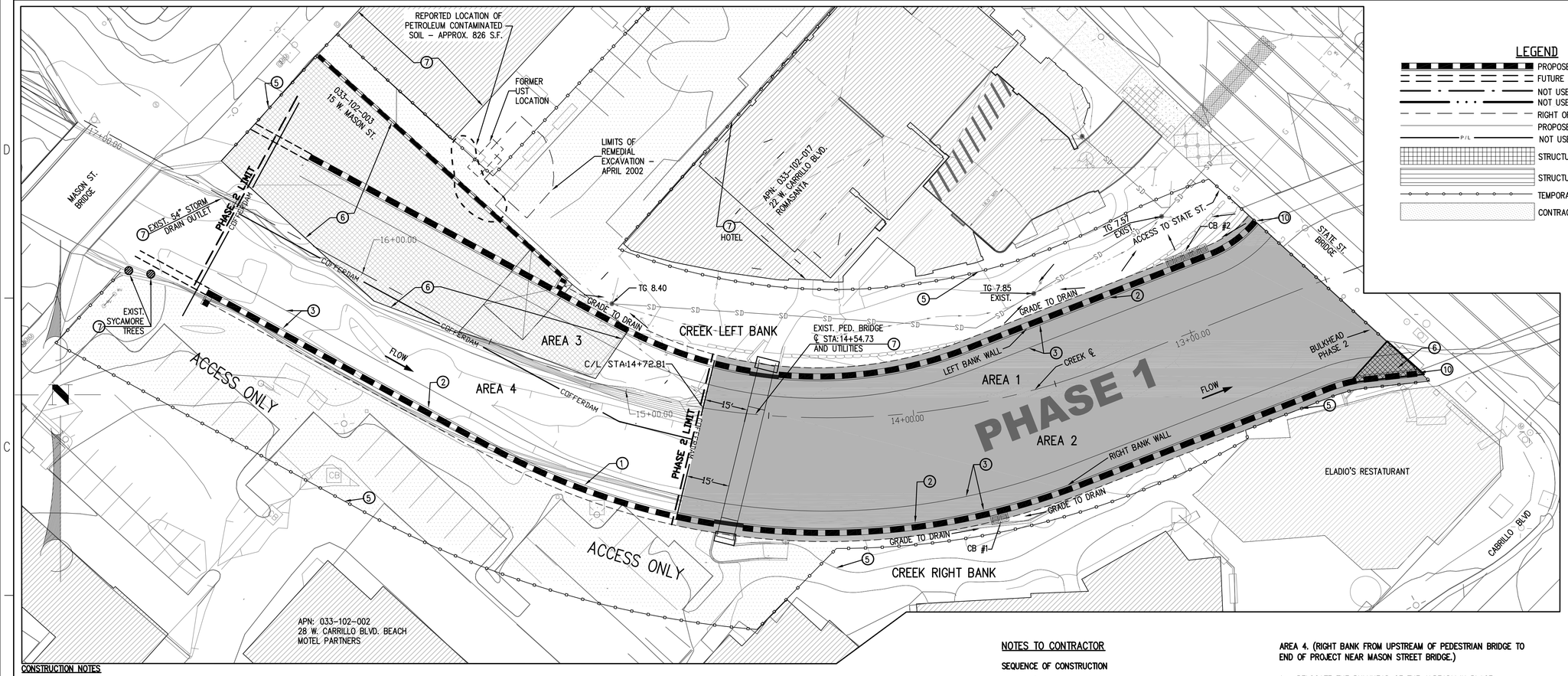


LEGEND

- PROPOSED CHANNEL WALL
- FUTURE CHANNEL WALL
- NOT USED
- NOT USED
- RIGHT OF WAY
- PROPOSED RIPRAP TOE
- NOT USED
- STRUCTURES TO BE DEMOLISHED
- STRUCTURES TO BE PROTECTED
- TEMPORARY SECURITY FENCE
- CONTRACTOR'S ACCESS & STAGING AREA

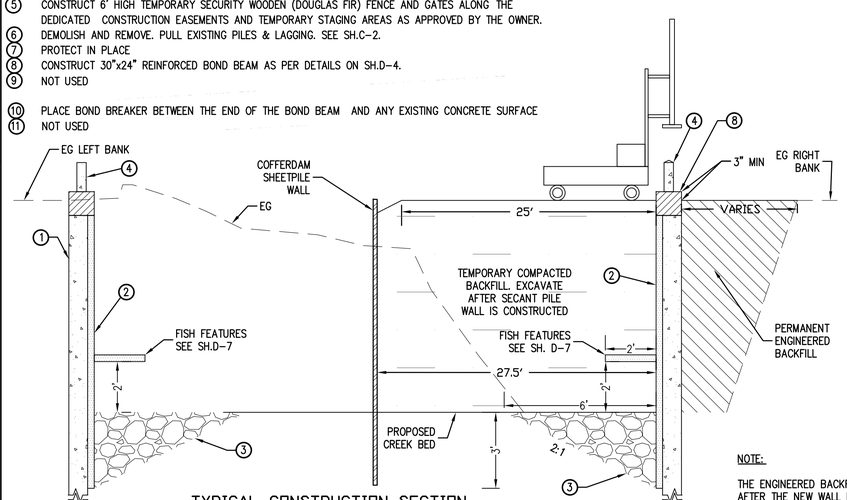
CONSTRUCTION NOTES

1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D-4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST PILES BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS-SECTION 72; ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. CONSTRUCT 42" HAND RAIL, SEE SH.D-2.
5. CONSTRUCT 6' HIGH TEMPORARY SECURITY WOODEN (DOUGLAS FIR) FENCE AND GATES ALONG THE DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREAS AS APPROVED BY THE OWNER.
6. DEMOLISH AND REMOVE. PULL EXISTING PILES & LAGGING. SEE SH.C-2.
7. PROTECT IN PLACE
8. CONSTRUCT 30"x24" REINFORCED BOND BEAM AS PER DETAILS ON SH.D-4.
9. NOT USED
10. PLACE BOND BREAKER BETWEEN THE END OF THE BOND BEAM AND ANY EXISTING CONCRETE SURFACE
11. NOT USED

SEQUENCE OF CONSTRUCTION WORK

SCALE: 1"=20'

0 20 40 60



TYPICAL CONSTRUCTION SECTION

NTS

NOTES TO CONTRACTOR

SEQUENCE OF CONSTRUCTION

AREA 3 (LEFT BANK FROM UPSTRAM OF THE PEDESTRIAN BRIDGE TO PROJECT LIMIT)

1. INSTALL TEMPORARY SECURITY FENCE ALONG THE DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREA.
2. CONSTRUCT COFFER DAM (USING SHEET PILE WALL) ALONG THE GEOMETRICAL CENTER LINE OF THE PROPOSED CREEK BED AND THE RESPECTIVE BULKHEADS AT THE MASON STREET BRIDGE AND UPSTREAM OF THE PEDESTRIAN BRIDGE SO THAT THE LEFT BANK FROM MASON STREET BRIDGE TO THE AREA UPSTREAM OF THE PEDESTRIAN BRIDGE IS FULLY ISOLATED FROM THE FLOW. THE CONTRACTOR SHALL UTILIZE THE EXISTING SHEETPILE AT THE DOWNSTREAM END (PER WALL TRANSITION PLAN SH.B-7) TO CONSTRUCT THE BULKHEAD UPSTREAM OF THE EXISTING PEDESTRIAN BRIDGE.
3. INSTALL AND OPERATE DEWATERING SYSTEM.
4. DEMOLISH AND REMOVE EXISTING BUILDING AT 15 W. MASON ST. PROTECT IN PLACE EXISTING 54" STORM DRAIN PIPE AND OUTLET LOCATED JUST DOWNSTREAM OF MASON ST. BRIDGE.
5. CLEAR AND GRUB THE AREA BETWEEN THE SHEET PILE WALL AND THE CONSTRUCTION EASEMENT ON THE LEFT BANK ONLY.
6. GRADE AND FILL LEFT BANK AS NECESSARY TO PLACE THE SECANT PILE WALL. CONSTRUCT 24" SECANT CONCRETE PILE WALL STARTING UPSTREAM OF THE PEDESTRIAN BRIDGE TO THE PROJECT LIMIT.
7. EXCAVATE EXCESS SOIL BETWEEN THE COFFER DAM AND THE NEW SECANT CONCRETE PILE WALL. STOCKPILE SOIL FOR USE ON THE RIGHT BANK DURING AREA 4.
8. COMPLETE THE NEW WALL WITH 30"X24" BOND BEAM , SHOTCRETE (COLORED AND TEXTURED), FISH LEDGES AND HAND RAILING.
9. GRADE AND RIP-RAP THE HABITAT EXPANSION ZONE
10. CONSTRUCT RIP-RAP REVETMENT ALONG THE FOOT OF THE NEW WALL. FINE GRADE THE NEW CREEK BED AND SCATTER ROCK CLUSTERS WITH D>24". PLACE ROCK CLUSTERS WITHIN 5 FT FROM THE FACE OF THE NEW WALL. THE ROCK CLUSTERS BETWEEN THE FISH LEDGES SHALL SERVE AS TIDE WATER GOBY'S HIDEOUTS

AREA 4. (RIGHT BANK FROM UPSTREAM OF PEDESTRIAN BRIDGE TO END OF PROJECT NEAR MASON STREET BRIDGE.)

1. RELOCATE THE BULKHEAD OF THE ALREADY IN PLACE SHEETPILE COFFERDAM WALL SO THAT RIGHT HALF OF THE CREEK FROM MASON STREET BRIDGE TO UPSTREAM OF THE PEDESTRIAN BRIDGE IS FULLY ISOLATED FROM THE FLOW. THIS DIVERTS THE STREAM FLOW TO THE IMPROVED LEFT BANK HALF OF THE CHANNEL. THE CONTRACTOR SHALL UTILIZE THE EXISTING SHEETPILE AT THE DOWNSTREAM END (PER WALL TRANSITION PLAN SH.B-7) TO CONSTRUCT THE BULKHEAD UPSTREAM OF THE EXISTING PEDESTRIAN BRIDGE.
2. PROTECT IN PLACE EXISTING SYCAMORE TREES NEAR MASON STREET BRIDGE.
3. BACKFILL AND GRADE THE AREA ON THE RIGHT BANK AS NECESSARY, BY IMPORTING BACKFILL MATERIAL FROM THE STOCKPILE AREA AND COMPACT FOR DRILLING THE SECANT PILES ON THE RIGHT BANK.
4. SIMILARLY CONSTRUCT SECANT PILES AND REINFORCED CONCRETE WALL ON THE RIGHT BANK.
5. COMPLETE THE NEW WALL WITH 30"X24" BOND BEAM, SHOTCRETE (COLORED AND TEXTURED), FISH LEDGES AND HAND RAILING.
6. CONSTRUCT RIP-RAP REVETMENT ALONG THE FOOT OF THE NEW WALL. FINE GRADE THE NEW CREEK BED AND SCATTER ROCK CLUSTERS WITH D>24". PLACE ROCK CLUSTERS WITHIN 5 FT FROM THE FACE OF THE NEW WALL. THE ROCK CLUSTERS BETWEEN THE FISH LEDGES SHALL SERVE AS TIDE WATER GOBY'S HIDEOUTS
7. REMOVE COFFERDAM AND TEMPORARY SECURITY FENCE. CLEANUP SITE, REPAIR DAMAGE TO TEMPORARY STAGING AND ACCESS ONLY AREAS. LEAVE SITE IN CLEAN, REPAIRED AND ORDERLY CONDITION.

NOTE:

THE ENGINEERED BACKFILL BEHIND THE WALL IS PART OF THE TEMPORARY BACKFILL, PLACED PRIOR TO WALL CONSTRUCTION. AFTER THE NEW WALL IS IN PLACE, THE TEMPORARY COMPACTED BACKFILL, BETWEEN THE NEW WALL AND THE COFFERDAM, IS TO BE REMOVED FROM THE SITE. THE SPACE REMAINING UNDERNEATH THE PATIO OF THE ELADIO'S RESTAURANT SHOULD BE BACKFILLED PRIOR TO THE NEW WALL CONSTRUCTION. IT IS CONTRACTOR'S RESPONSIBILITY TO ADOPT SUITABLE WAY TO SUPPORT THE PATIO SLAB PRIOR TO ERECTION OF THE NEW WALL.

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
SEQUENCE OF CONSTRUCTION
CITY OF SANTA BARBARA, CALIFORNIA

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DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

DISTRICT FILE NO. 221/111
SPEC. NO.
FILE NAME: 1910CSP03-#4

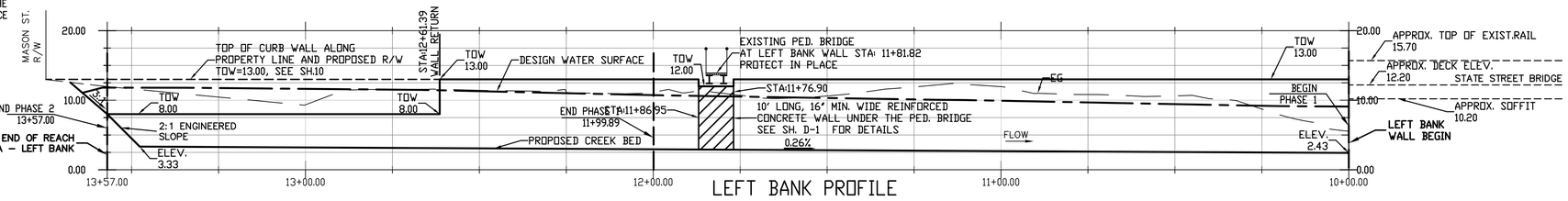
SCALE AS SHOWN
SHEET 4 OF 22 SHEETS
C-3

11/3/2010 4:33:55 PM

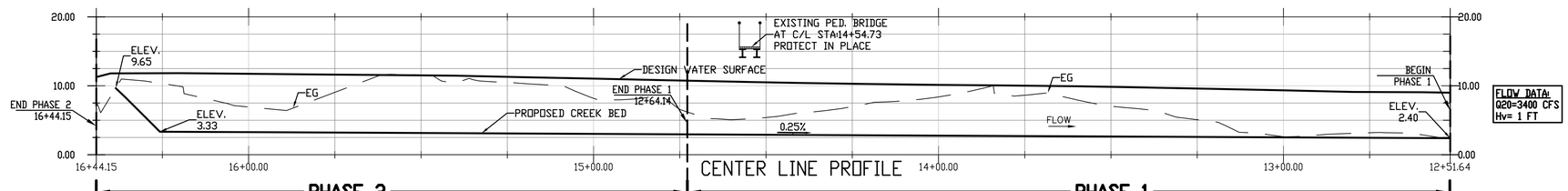
Line Table: Alignments		
Line #	Length	Direction
L1	53.019	S68° 17' 13.81"W
L2	243.686	N61° 18' 29.09"W
L3	17.499	S83° 35' 31.15"W
L4	91.978	S68° 46' 47.83"W
L5	111.425	N61° 21' 16.05"W
L6	89.702	S68° 46' 47.83"W
L7	121.663	N61° 21' 16.05"W

Curve Table: Alignments			
Curve #	Radius	Length	Δ
C1	1500.000	207.004	7° 54' 25"
C2	270.000	237.527	50° 24' 17"
C3	55.000	14.219	14° 48' 43"
C4	240.000	208.876	49° 51' 56"
C5	40.029	20.313	29° 04' 30"
C6	144.000	125.326	49° 51' 56"

NOTE
1. LANDSCAPING BY OTHERS.
2. ALL EXIST.TREES & UTILITIES BEYOND THE SBCFCD ROW TO BE PROTECTED IN PLACE



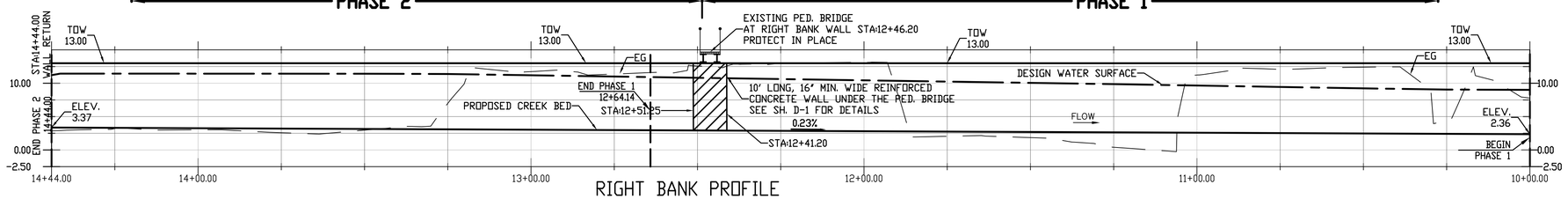
LEFT BANK PROFILE



FLOW DATA:
Q20=3400 CFS
Hv= 1 FT

CENTER LINE PROFILE

PHASE 2 — **PHASE 1**

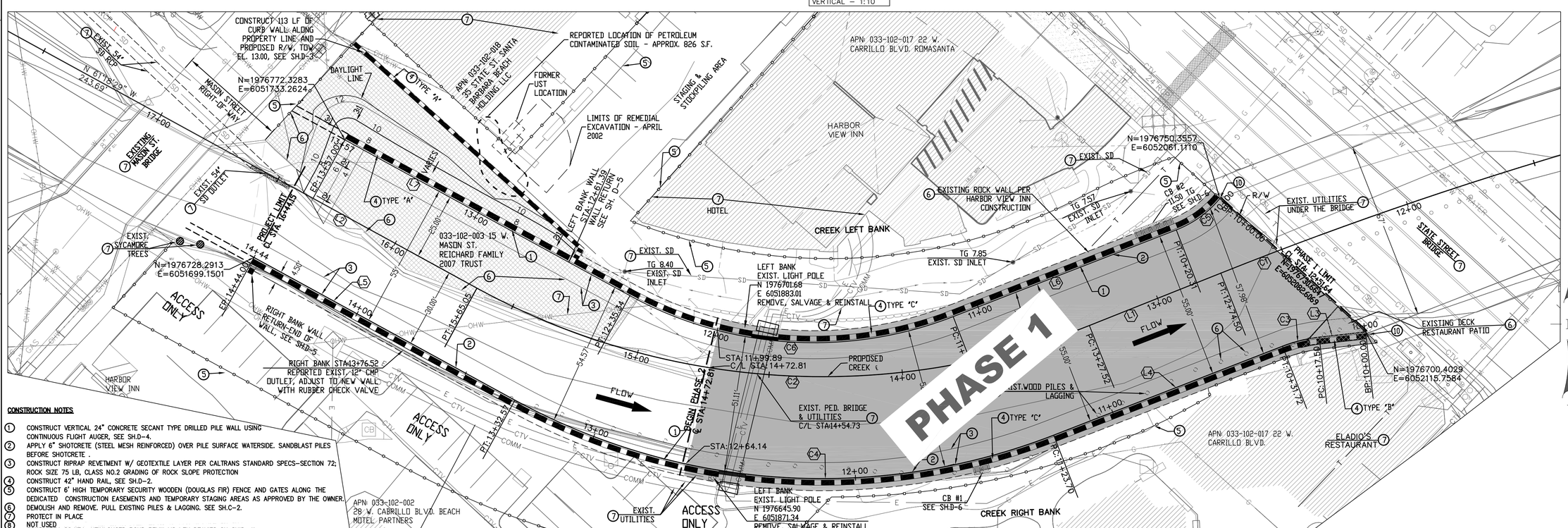


RIGHT BANK PROFILE

PROFILE SCALE:
HORIZONTAL – 1:20
VERTICAL – 1:10

LEGEND

- PROPOSED CHANNEL WALL
- FUTURE CHANNEL WALL
- MERGED PARCEL BOUNDARY
- EASEMENT LINE
- RIGHT OF WAY
- PROPOSED RIPRAP TOE
- PROPERTY LINE
- STRUCTURES TO BE DEMOLISHED
- STRUCTURES TO BE PROTECTED
- TEMPORARY SECURITY FENCE
- CONTRACTOR'S ACCESS & STAGING AREA



CONSTRUCTION NOTES

1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D-4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST PILES BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS–SECTION 72: ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. CONSTRUCT 42" HAND RAIL, SEE SH.D–2.
5. CONSTRUCT 6' HIGH TEMPORARY SECURITY WOODEN (DOUGLAS FIR) FENCE AND GATES ALONG THE DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREAS AS APPROVED BY THE OWNER.
6. DEMOLISH AND REMOVE. PULL EXISTING PILES & LAGGING. SEE SH.C–2.
7. PROTECT IN PLACE
8. NOT USED
9. NOT USED
10. PLACE BOND BREAKER BETWEEN THE END OF THE BOND BEAM AND ANY EXISTING CONCRETE SURFACE
11. NOT USED

LOWER MISSION CREEK – REACH 1A

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
PLAN AND PROFILES
STA:14+72.81 TO STA:16+44.15
CITY OF SANTA BARBARA, CALIFORNIA

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CHECKED BY: MHB

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CORPS OF ENGINEERS

SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 191OCPR01-#5

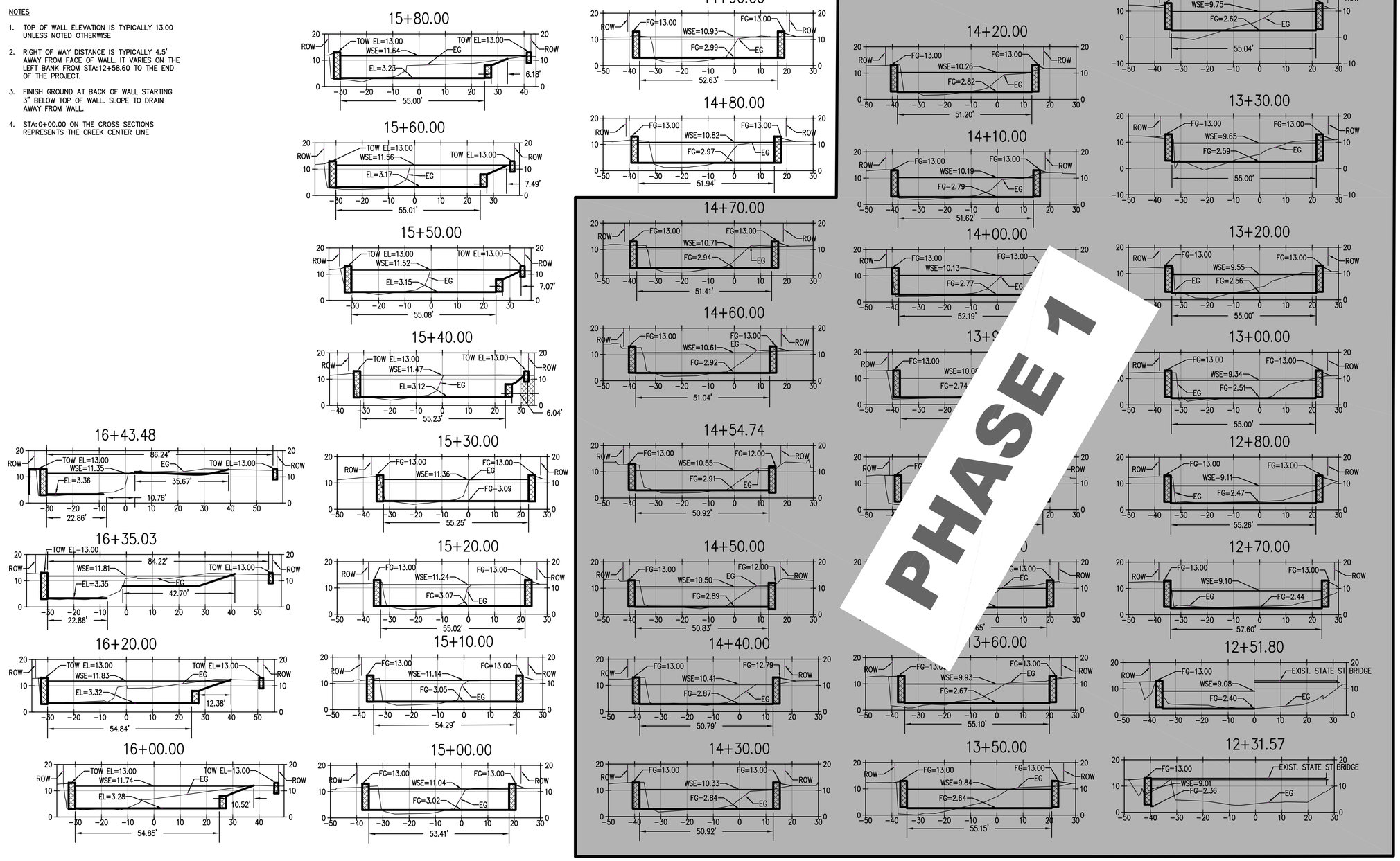
DISTRICT FILE NO. 221/112
SPEC. NO.

SCALE AS SHOWN
SHEET 5 OF 22 SHEETS
C-4

11/3/2010 4:37:02 PM

NOTES

1. TOP OF WALL ELEVATION IS TYPICALLY 13.00 UNLESS NOTED OTHERWISE
2. RIGHT OF WAY DISTANCE IS TYPICALLY 4.5' AWAY FROM FACE OF WALL. IT VARIES ON THE LEFT BANK FROM STA:12+58.60 TO THE END OF THE PROJECT.
3. FINISH GROUND AT BACK OF WALL STARTING 3" BELOW TOP OF WALL. SLOPE TO DRAIN AWAY FROM WALL.
4. STA:0+00.00 ON THE CROSS SECTIONS REPRESENTS THE CREEK CENTER LINE



PROPOSED PHASE 1 CHANNEL CROSS SECTIONS
VIEWED UPSTREAM

HORIZONTAL SCALE 1"=20'
VERTICAL SCALE 1"=20'

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A - LOWER MISSION CREEK
PHASE 2
CHANNEL CROSS SECTIONS
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERD BY: DEAN RYAN CONSULTANTS & DESIGNERS, INC. 7250 Vanden Dr. Suite 100 Los Angeles, California 90017 Tel. 213.687.1130 Fax 213.687.1139

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U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: COL. R.MARK TOY, CHIEF, DESIGN BRANCH

FILE NAME: 1910CSC01-#6

DISTRICT FILE NO. 221/113

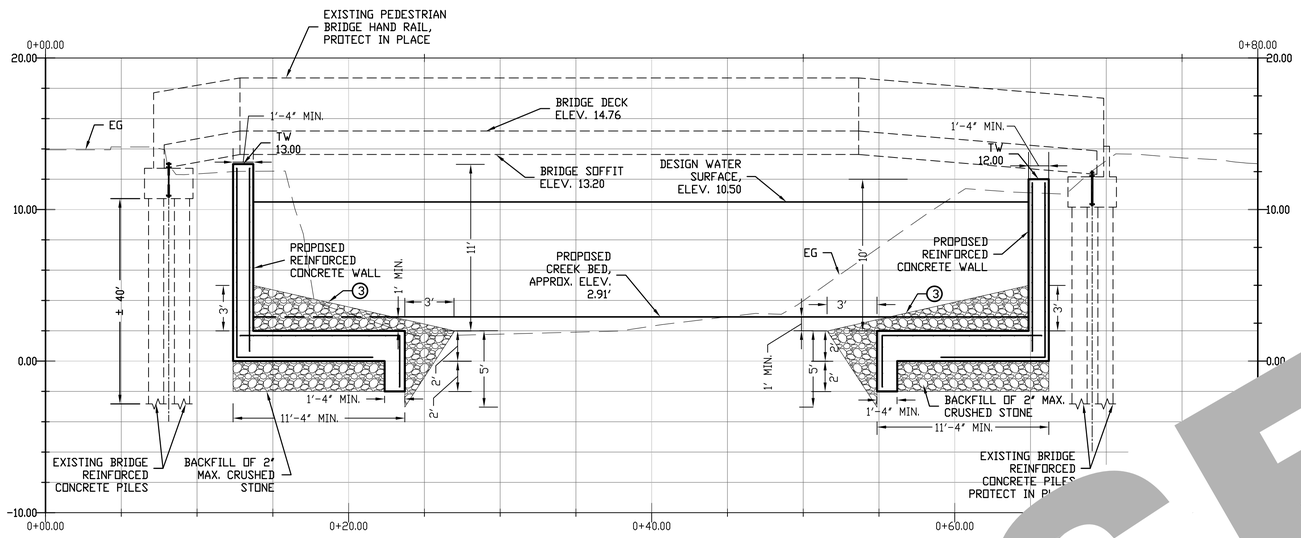
SPEC. NO.

SCALE AS SHOWN

SHEET 6 OF 22 SHEETS

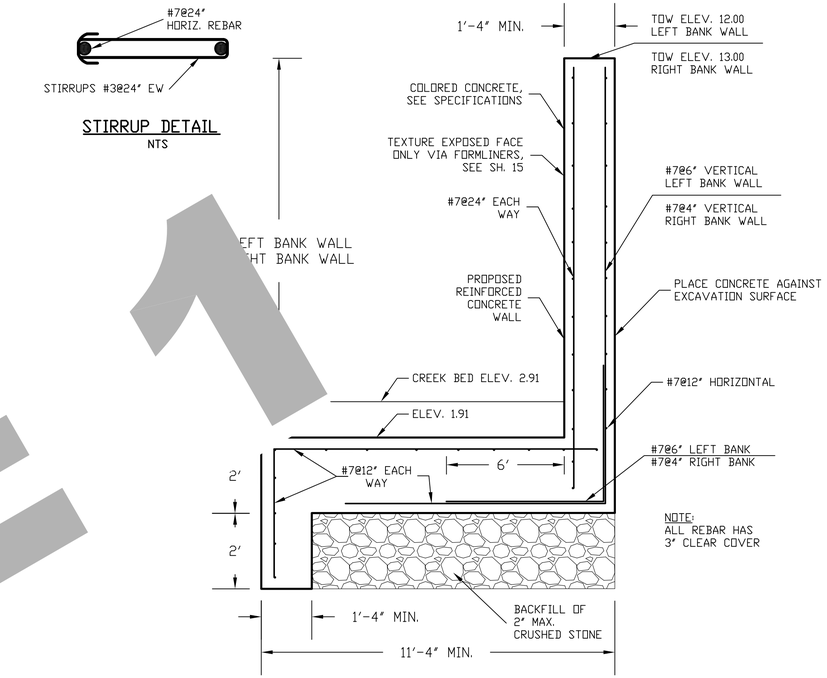
C-5

11/3/2010 4:37:34 PM



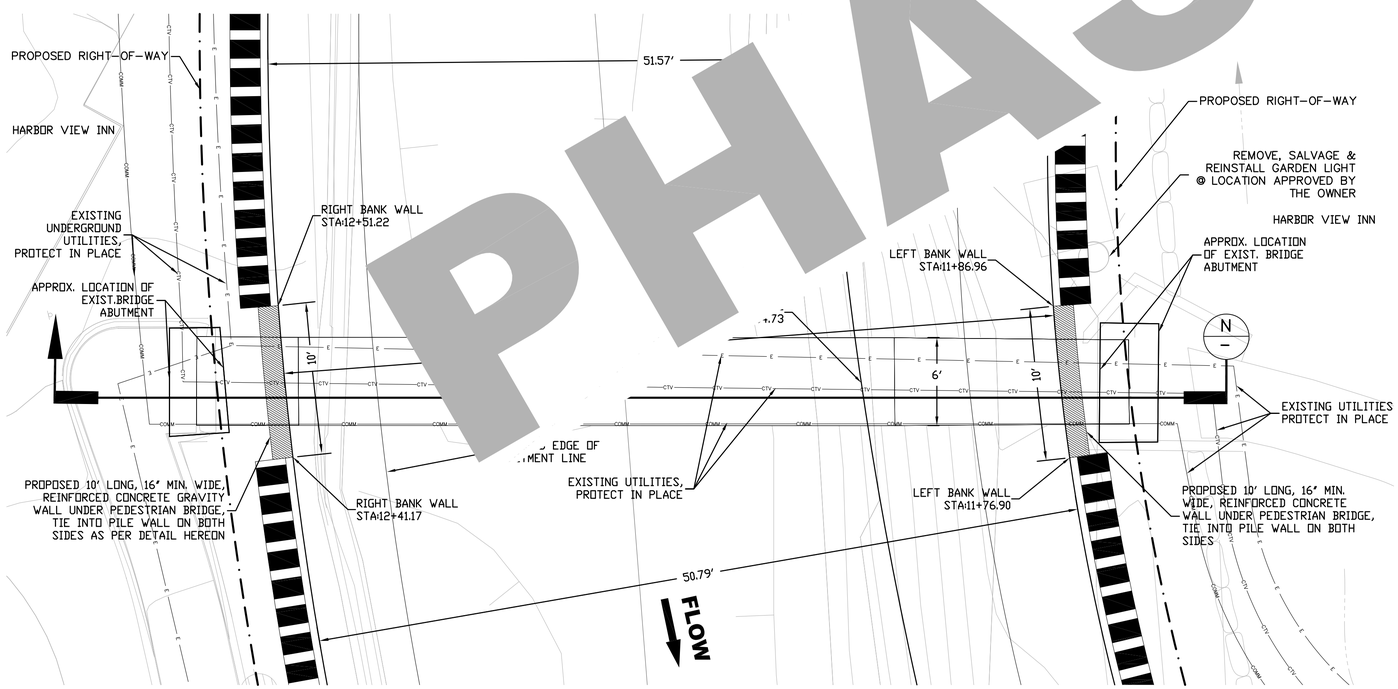
SECTION N-N

HORIZ. SCALE 1"=5'
VERT. SCALE 1"=5'



TYPICAL DETAIL - WALL UNDER PED. BRIDGE

SCALE 1"=4'



PEDESTRIAN BRIDGE - PLAN AND DETAILS

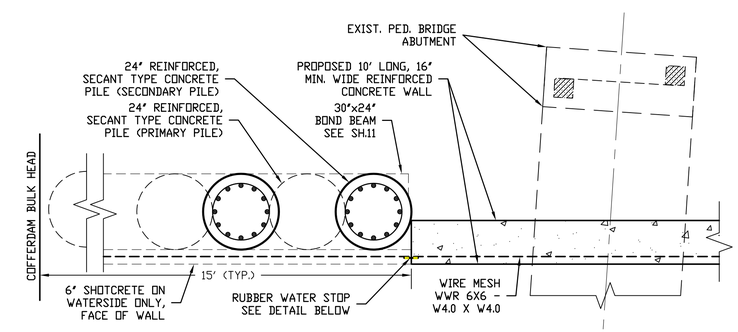
SCALE: 1"=5'
0 5 10 15

NOTE

PROPOSED CHANNEL WIDTH IS TYPICALLY 55 FEET UNLESS OTHERWISE INDICATED HEREON; WALL HEIGHT IS APPROXIMATELY 10 FEET.

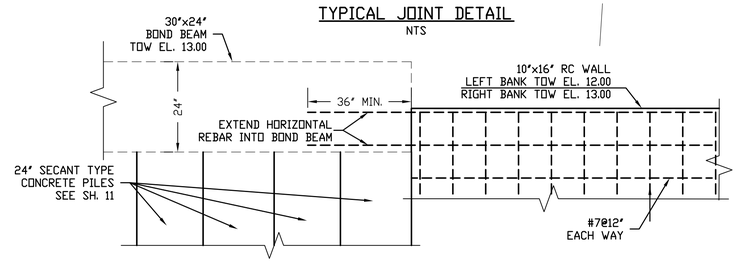
CONSTRUCTION NOTES

(3) CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS.-SECTION 72; ROCK SIZE 200LB,



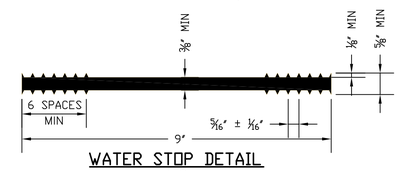
TYPICAL JOINT DETAIL

NTS



TYPICAL JOINT DETAIL

NTS



WATER STOP DETAIL

NTS

PHASE 1

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A - LOWER MISSION CREEK
PHASE 2
PLAN AND DETAILS - PROPOSED WALLS UNDER EXISTING PEDESTRIAN BRIDGE
CITY OF SANTA BARBARA, CALIFORNIA

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SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 191OCDT01-#7

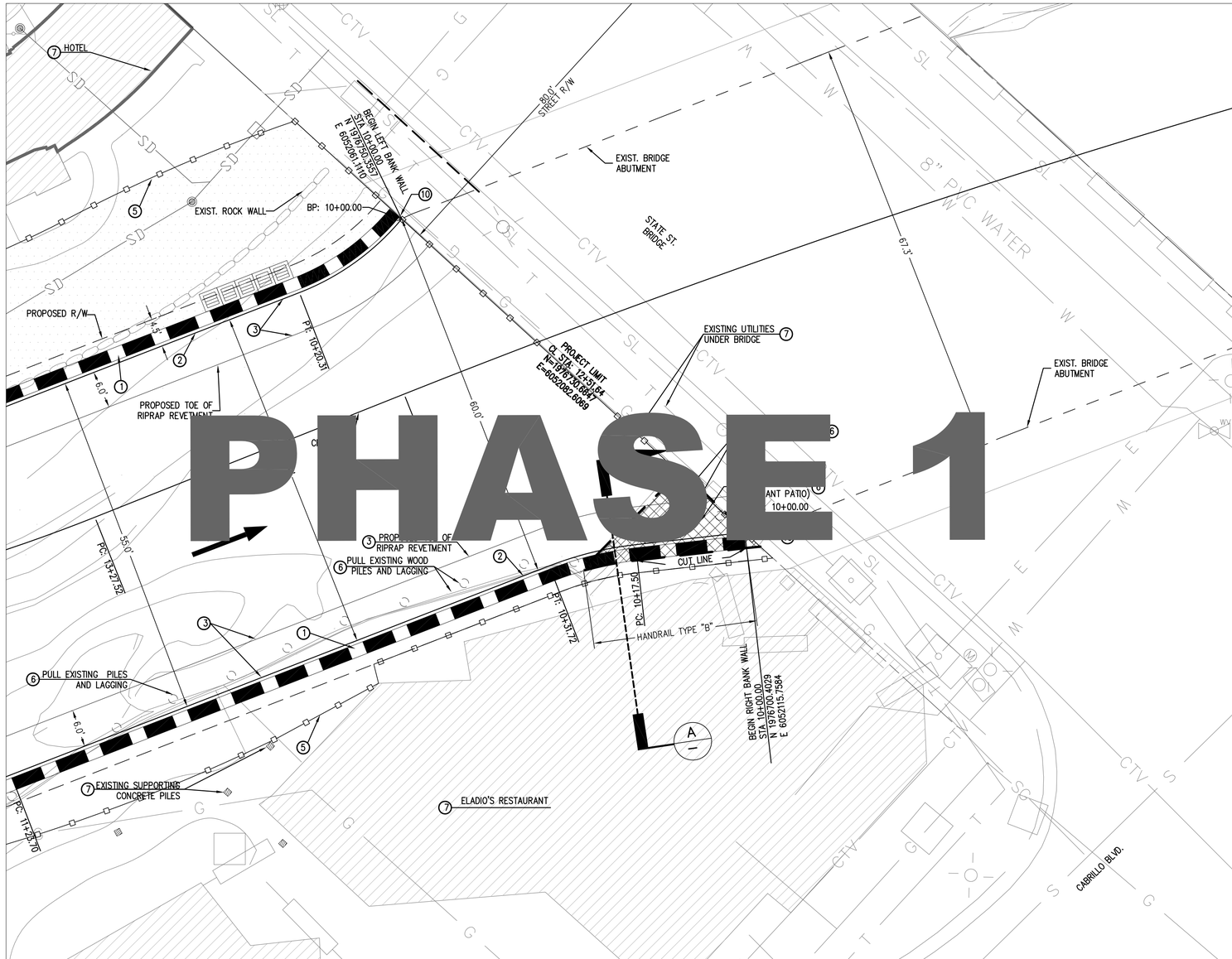
DISTRICT FILE NO. 221/114
SPEC. NO.

SCALE AS SHOWN

SHEET 7 OF 22 SHEETS

D-1

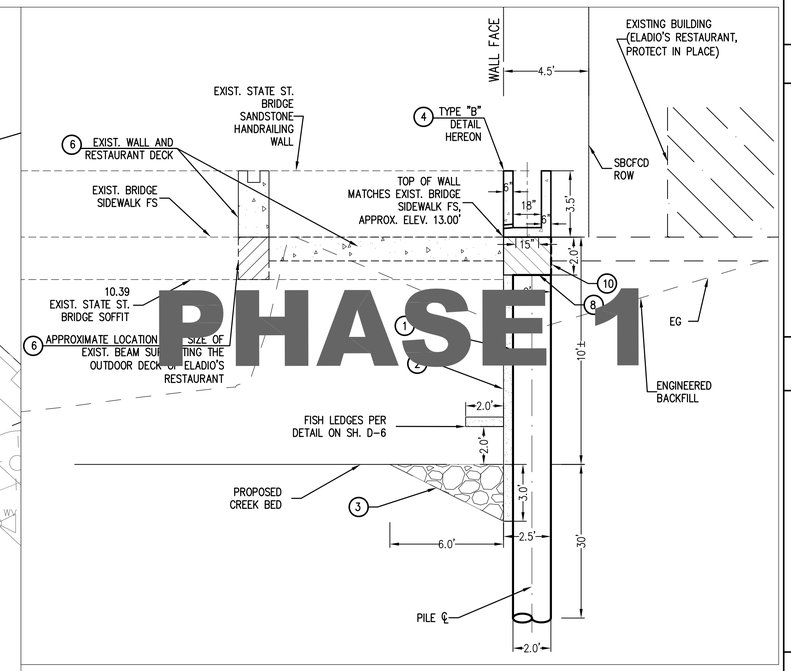
11/3/2010 4:38:21 PM



BEGIN REACH 1A – PLAN

SCALE: 1"=10'

0 10 20 30

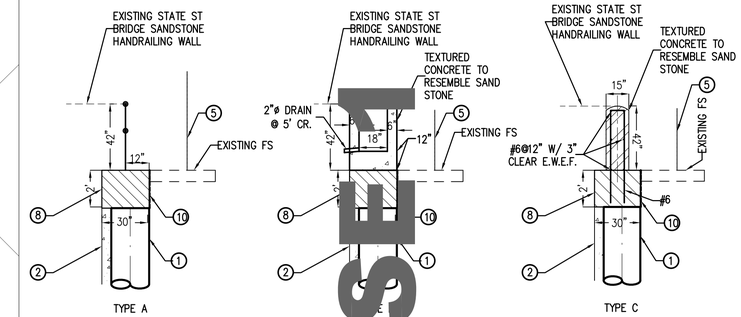


RIGHT BANK PROPOSED DRILLED PILE CREEK WALL
AT STA:10+00.00 DETAIL (ELADIO'S CAFE)

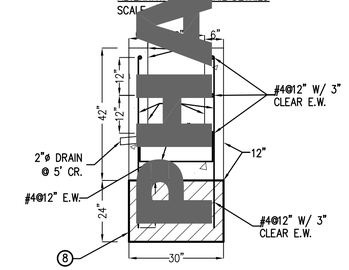
A

SCALE: 1"=4'

0 4 8 12



ALTERNATIVE HANDRAIL DETAILS
SCALE:



HANDRAIL TYPE "B" – REINF. DETAIL
NTS

NOTE

PROPOSED CHANNEL WIDTH IS TYPICALLY 55 FEET UNLESS OTHERWISE INDICATED HEREON; WALL HEIGHT ABOVE CREEK BED IS APPROXIMATELY 10 FEET.

LEGEND

- PROPOSED CHANNEL WALL
- NOT USED
- NOT USED
- NOT USED
- RIGHT OF WAY
- PROPOSED RIPRAP TOE
- NOT USED
- STRUCTURES TO BE DEMOLISHED
- STRUCTURES TO BE PROTECTED
- TEMPORARY SECURITY FENCE
- CONTRACTOR'S ACCESS & STAGING AREA

CONSTRUCTION NOTES

1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D–4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST PILES BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS–SECTION 72; ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. CONSTRUCT 42" HAND RAIL, SEE SH.D–2.
5. CONSTRUCT 6' HIGH TEMPORARY SECURITY WOODEN (DOUGLAS FIR) FENCE AND GATES ALONG THE DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREAS AS APPROVED BY THE OWNER.
6. DEMOLISH AND REMOVE. PULL EXISTING PILES & LAGGING. SEE SH.C–2.
7. PROTECT IN PLACE
8. CONSTRUCT 30"x24" REINFORCED BOND BEAM AS PER DETAILS ON SH.D–4.
9. NOT USED
10. PLACE BOND BREAKER BETWEEN THE END OF THE BOND BEAM AND ANY EXISTING CONCRETE SURFACE
11. NOT USED

HANDRAILING NOTES

TYPE A – STANDARD 42" METAL PIPE HAND RAILING PER SPPWC 606–2 TYPE A, ANCHOR TO THE TOP OF THE BOND BEAM USING STANDARD BASE PLATE AND EXPANSION ANCHORS (FROM STA:12+61.39 TO STA:13+57.00 OF THE LEFT BANK WALL, THE LOWER WALL AND THE ENTIRE CURB WALL)

TYPE B – PLANTER TYPE; TEXTURED & COLORED REINFORCED CONCRETE TO RESEMBLE SAND STONE (FROM STA:10+00.00 TO STA:10+25.00 OF THE RIGHT BANK WALL, ALONG THE FORMER PATIO)

TYPE C – MASONRY TYPE; TEXTURED & COLORED REINFORCED CONCRETE TO RESEMBLE SAND STONE (FOR THE REST OF THE WALLS, INCLUDING THE WALL RETURNS)

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
PLAN & DETAILS
STATE ST. BRIDGE AND ELADIO'S PATIO
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERO BY:

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DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

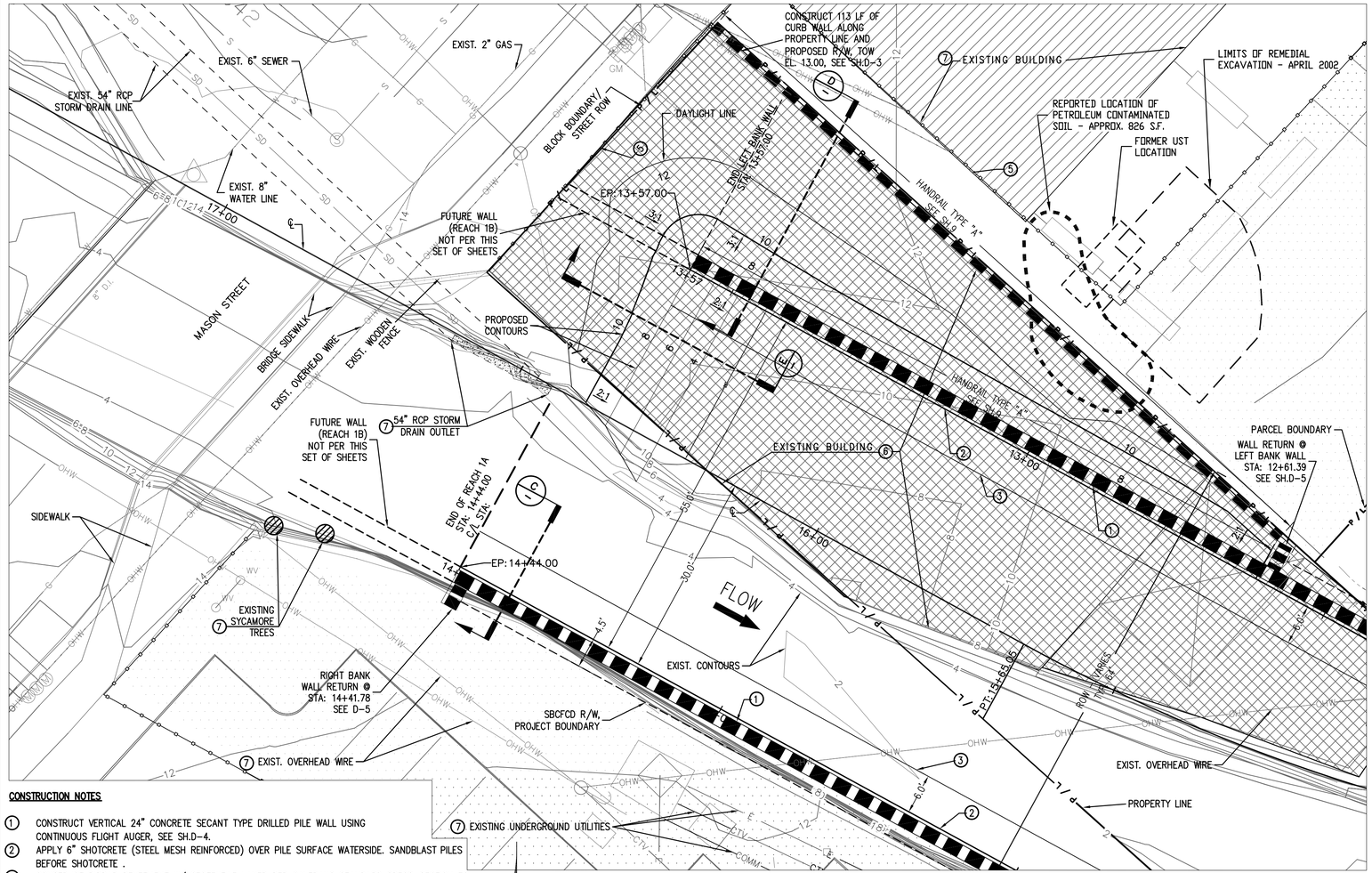
SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 1910C0T02–#8

DISTRICT FILE NO. 221/115
SPEC. NO.

SCALE AS SHOWN
SHEET 8 OF 22 SHEETS
D–2

11/3/2010 4:40:06 PM



END REACH 1A - PLAN VIEW

SCALE: 1"=10'

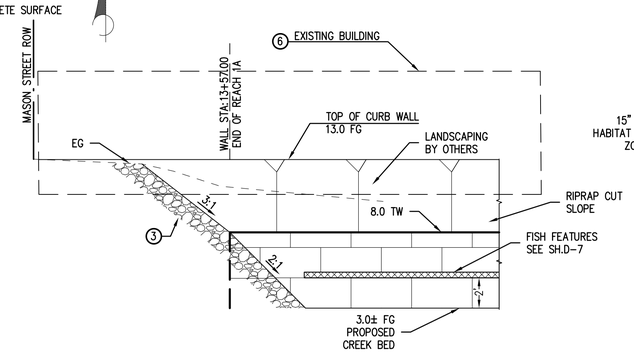
0 10 20 30

CONSTRUCTION NOTES

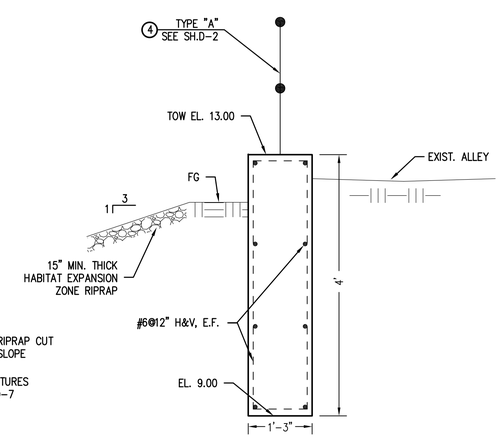
1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D-4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST PILES BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS-SECTION 72; ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. CONSTRUCT 42" HAND RAIL, SEE SH.D-2.
5. CONSTRUCT 6' HIGH TEMPORARY SECURITY WOODEN (DOUGLAS FIR) FENCE AND GATES ALONG THE DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREAS AS APPROVED BY THE OWNER.
6. DEMOLISH AND REMOVE. PULL EXISTING PILES & LAGGING. SEE SH.C-2.
7. PROTECT IN PLACE
8. CONSTRUCT 30"x24" REINFORCED BOND BEAM AS PER DETAILS ON SH.D-4.
9. NOT USED
10. PLACE BOND BREAKER BETWEEN THE END OF THE BOND BEAM AND ANY EXISTING CONCRETE SURFACE
11. NOT USED

LEGEND

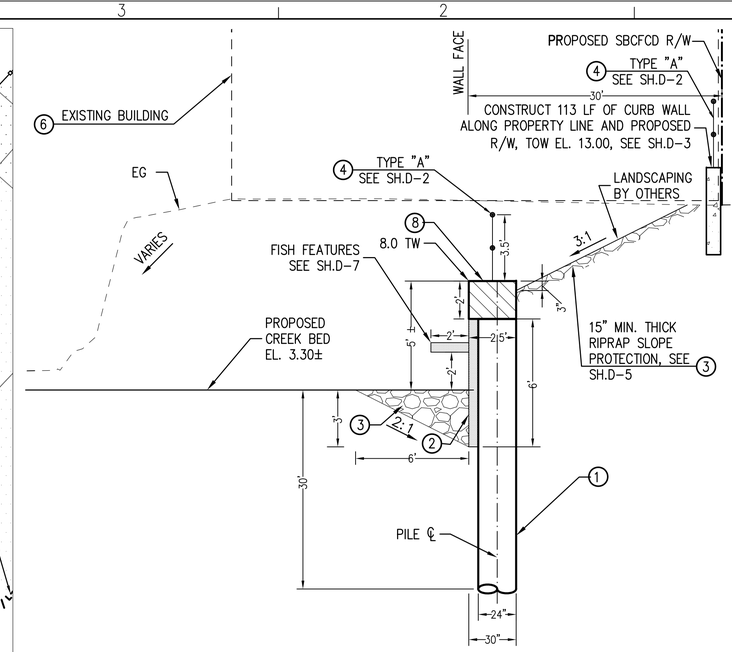
- PROPOSED CHANNEL WALL
- FUTURE CHANNEL WALL
- NOT USED
- NOT USED
- RIGHT OF WAY
- PROPOSED RIPRAP TOE
- PROPERTY LINE
- STRUCTURES TO BE DEMOLISHED
- STRUCTURES TO BE PROTECTED
- TEMPORARY SECURITY FENCE
- CONTRACTOR'S ACCESS & STAGING AREA



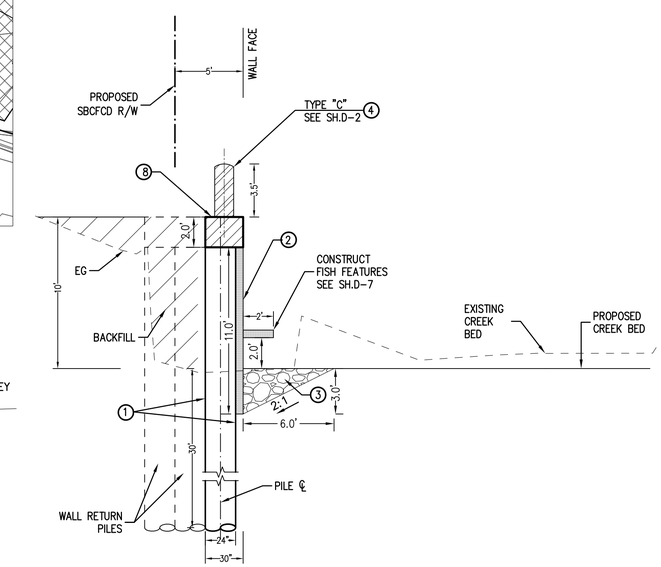
SLOPE CROSS SECTION
NTS
E



CURB WALL DETAIL
NTS



DRILLED PILE LEFT BANK RETAINING WALL
AT STA:13+50.42 DETAIL - SCALE 1"=4'
D



DRILLED PILE RIGHT BANK RETAINING WALL
AT STA:14+40.00 DETAIL - NTS
C

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A - LOWER MISSION CREEK
PHASE 2
PLAN AND DETAILS
MASON ST. BRIDGE
CITY OF SANTA BARBARA, CALIFORNIA

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DRAWN BY: VAM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:
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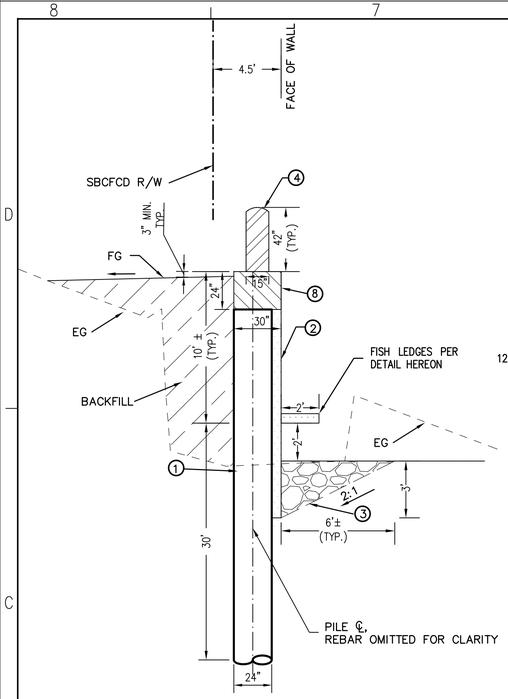
CHIEF, DESIGN BRANCH

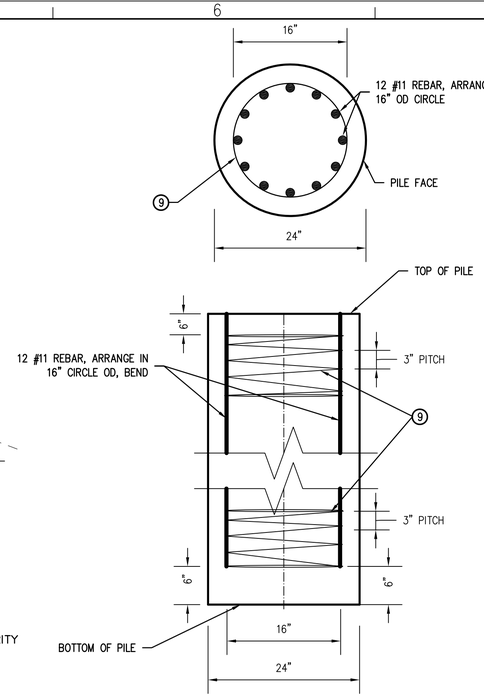
FILE NAME: 1910CDT03-#9
SPEC. NO.
DISTRICT FILE NO. 221/16

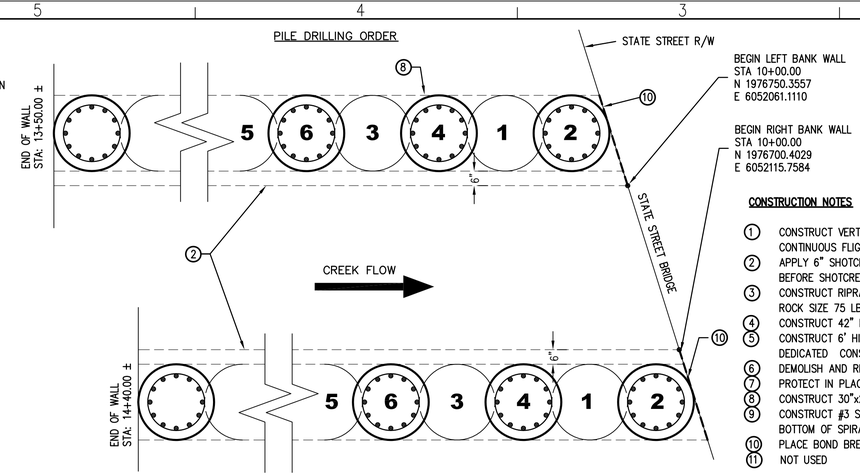
SCALE AS SHOWN
SHEET 9 OF 22 SHEETS
D-3

11/3/2010 4:41:43 PM



DRILLED (SECANT) PILE RETAINING WALL (TYP.)
NTS



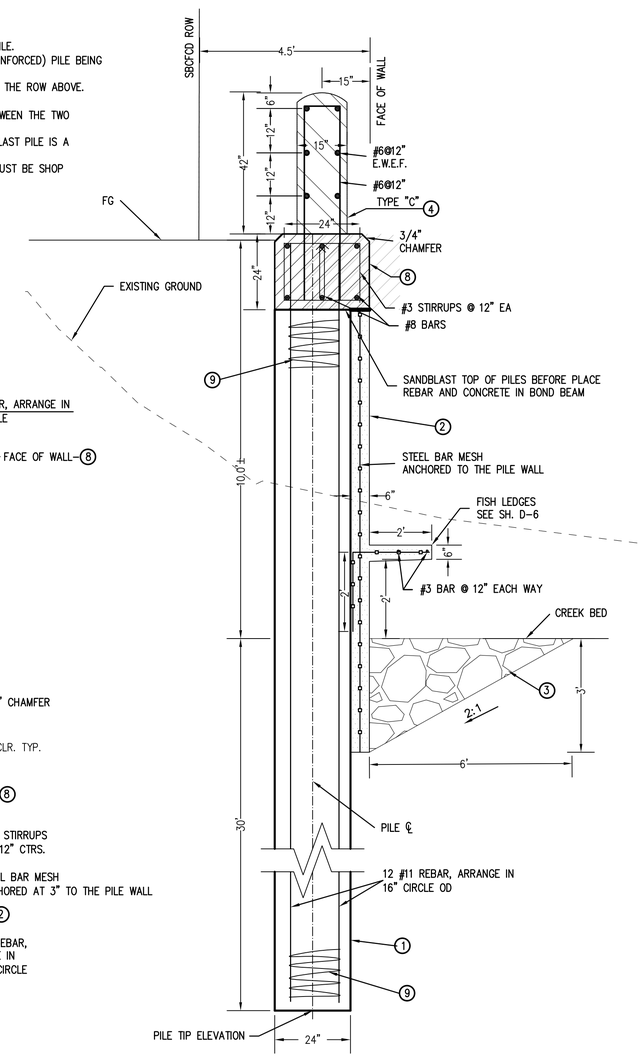


CONSTRUCTION NOTES

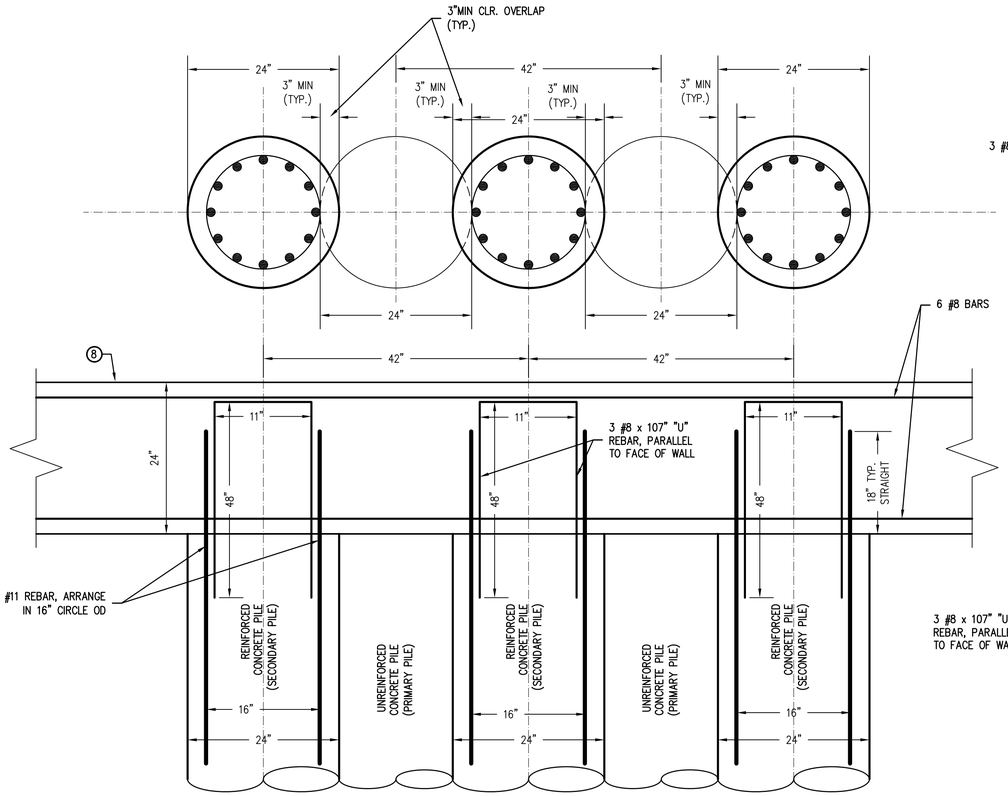
1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D-4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST PILES BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS-SECTION 72; ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. CONSTRUCT 42" HAND RAIL, SEE SH.D-2.
5. CONSTRUCT 6' HIGH TEMPORARY SECURITY WOODEN (DOUGLAS FIR) FENCE AND GATES ALONG THE DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREAS AS APPROVED BY THE OWNER.
6. DEMOLISH AND REMOVE. PULL EXISTING PILES & LAGGING. SEE SH.C-2.
7. PROTECT IN PLACE
8. CONSTRUCT 30"x24" REINFORCED BOND BEAM AS PER DETAILS ON SH.D-4.
9. CONSTRUCT #3 SPIRAL STEEL CAGE WITH 3" PITCH. TOP OF SPIRAL SHALL BE 6" BELOW TOP OF PILE. BOTTOM OF SPIRAL SHALL BE 6" ABOVE BOTTOM OF PILE
10. PLACE BOND BREAKER BETWEEN THE END OF THE BOND BEAM AND ANY EXISTING CONCRETE SURFACE
11. NOT USED

NOTE:

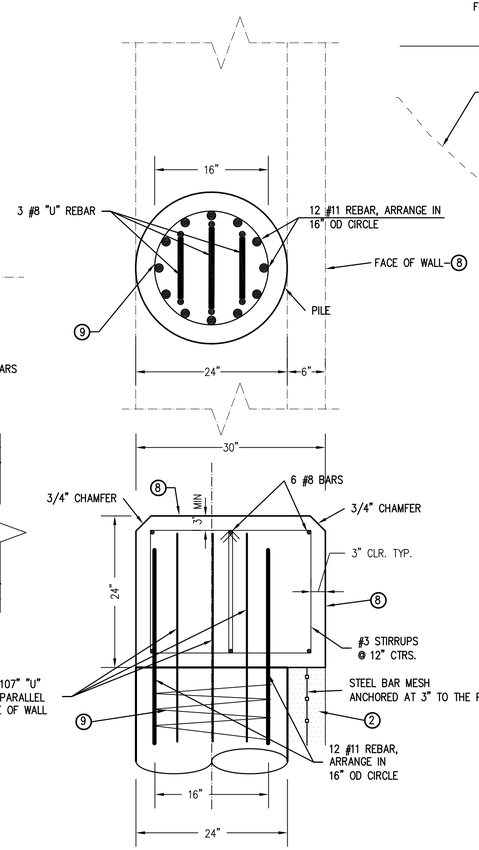
1. ALL PILE WALLS BEGIN AND END WITH A REINFORCED (SECONDARY) PILE.
2. THE CONSTRUCTION STARTS WITH THE DRILLING OF A PRIMARY (UNREINFORCED) PILE BEING #1 IN THE ROW ABOVE.
3. THEN THE FIRST REINFORCED (SECONDARY) PILE IS DRILLED AS #2 IN THE ROW ABOVE.
4. NEXT PRIMARY (UNREINFORCED) PILE IS DRILLED AS #3 IN THE ROW.
5. A REINFORCED (SECONDARY) PILE IS DRILLED AS #4 IN THE ROW BETWEEN THE TWO PRIMARY (UNREINFORCED) PILES.
6. THIS PROCESS CONTINUES UNTIL THE END OF THE WALL WHERE THE LAST PILE IS A REINFORCED (SECONDARY) ONE.
7. FIELD WELDING AND SPLICING IS NOT PERMITTED. ALL STEEL CAGES MUST BE SHOP MANUFACTURED



TYPICAL DRILLED PILE RETAINING WALL DETAIL
NTS



TYPICAL DRILLED PILE RETAINING WALL DETAILS
NTS



SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A - LOWER MISSION CREEK
PHASE 2
SECANT PILE WALL DETAILS
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERED BY:
DEAN RYAN
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Tel 213.687.1139
Fax 213.687.1139

DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

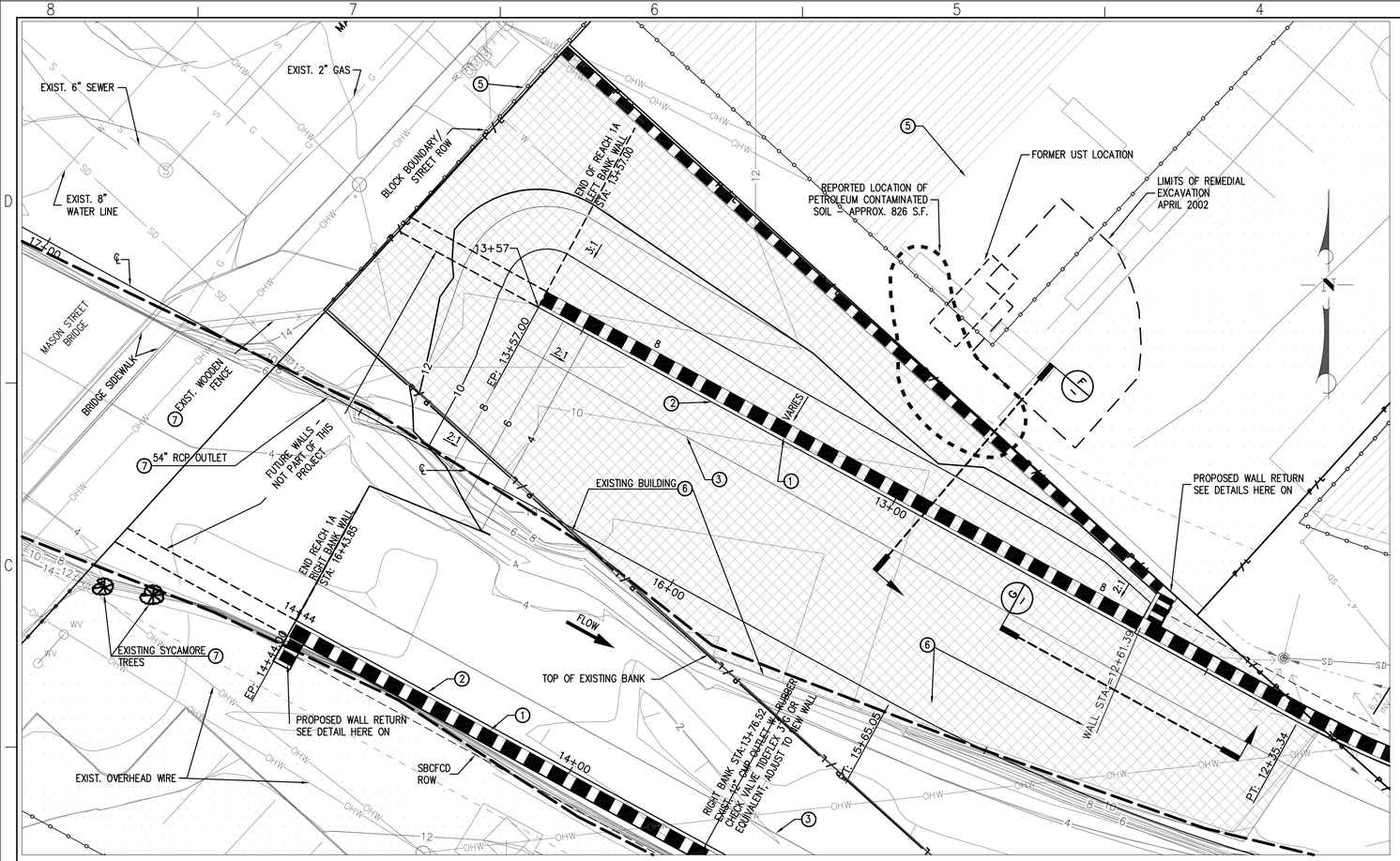
SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 1910CDT04-#10

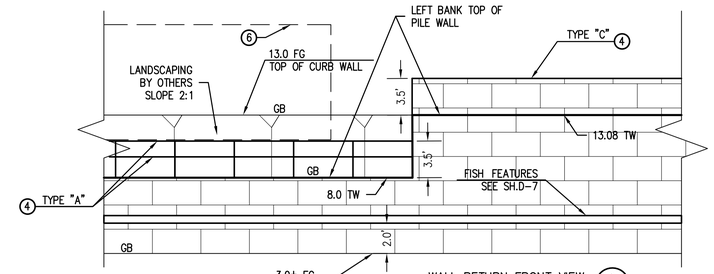
DISTRICT FILE NO. 221/117
SPEC. NO.

SCALE AS SHOWN
SHEET 10 OF 22 SHEETS
D-4

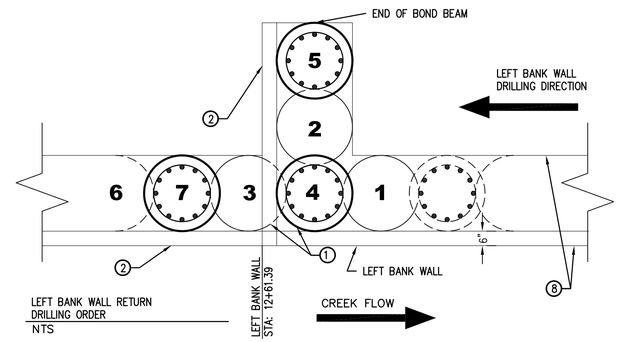
11/3/2010 4:42:57 PM



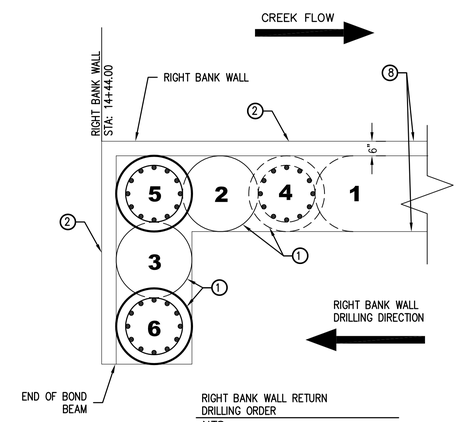
END OF REACH 1A – PLAN VIEW
SCALE: 1"=10'
0 10 20 30



WALL RETURN FRONT VIEW
NTS



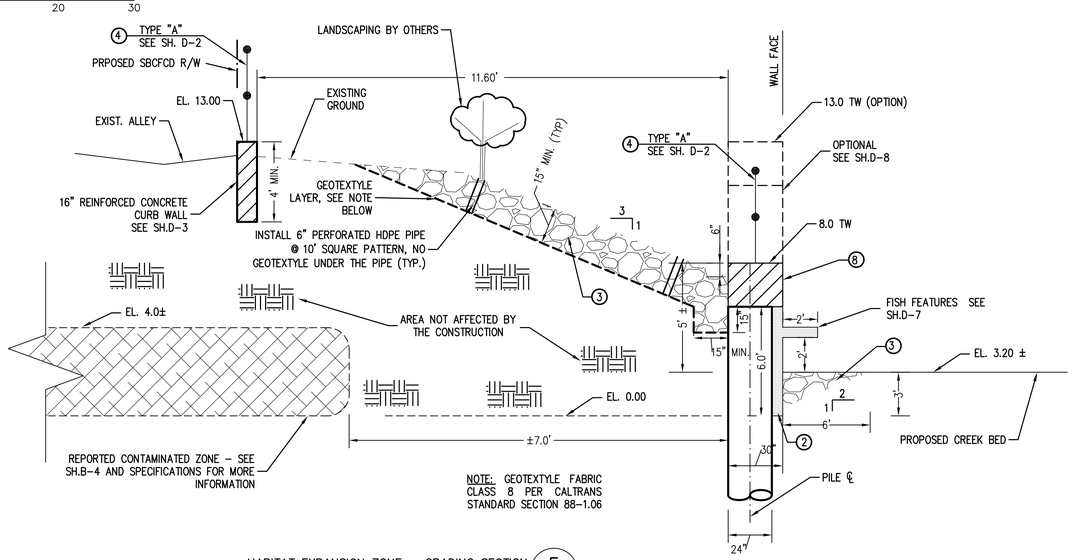
LEFT BANK WALL RETURN DRILLING ORDER
NTS



RIGHT BANK WALL RETURN DRILLING ORDER
NTS

CONSTRUCTION NOTES

1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D-4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST PILES BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS-SECTION 72; ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. CONSTRUCT 42" HAND RAIL, SEE SH.D-2.
5. CONSTRUCT 6' HIGH TEMPORARY SECURITY WOODEN (DOUGLAS FIR) FENCE AND GATES ALONG THE DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREAS AS APPROVED BY THE OWNER.
6. DEMOLISH AND REMOVE. PULL EXISTING PILES & LAGGING. SEE SH.C-2.
7. PROTECT IN PLACE
8. CONSTRUCT 30"x24" REINFORCED BOND BEAM AS PER DETAILS ON SH.D-4.
9. NOT USED
10. NOT USED
11. NOT USED



NOTE: GEOTEXTYLE FABRIC CLASS 8 PER CALTRANS STANDARD SECTION 88-1.06

HABITAT EXPANSION ZONE – GRADING SECTION (F / –)
NTS

LEGEND

- PROPOSED CHANNEL WALL
- FUTURE CHANNEL WALL
- MERGED PARCEL BOUNDARY — NOT USED
- EASEMENT LINE — NOT USED
- RIGHT OF WAY
- PROPOSED RIPRAP TOE
- PROPERTY LINE
- STRUCTURES TO BE DEMOLISHED
- STRUCTURES TO BE PROTECTED
- TEMPORARY SECURITY FENCE
- CONTRACTOR'S ACCESS & STAGING AREA

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
WALL RETURNS
PLAN AND DETAILS
CITY OF SANTA BARBARA, CALIFORNIA

PREAPPERD BY:
DEAN RYAN
CONSULTANTS & DESIGNERS, INC.
Los Angeles, California 90017
Tel. 213.487.1130

DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

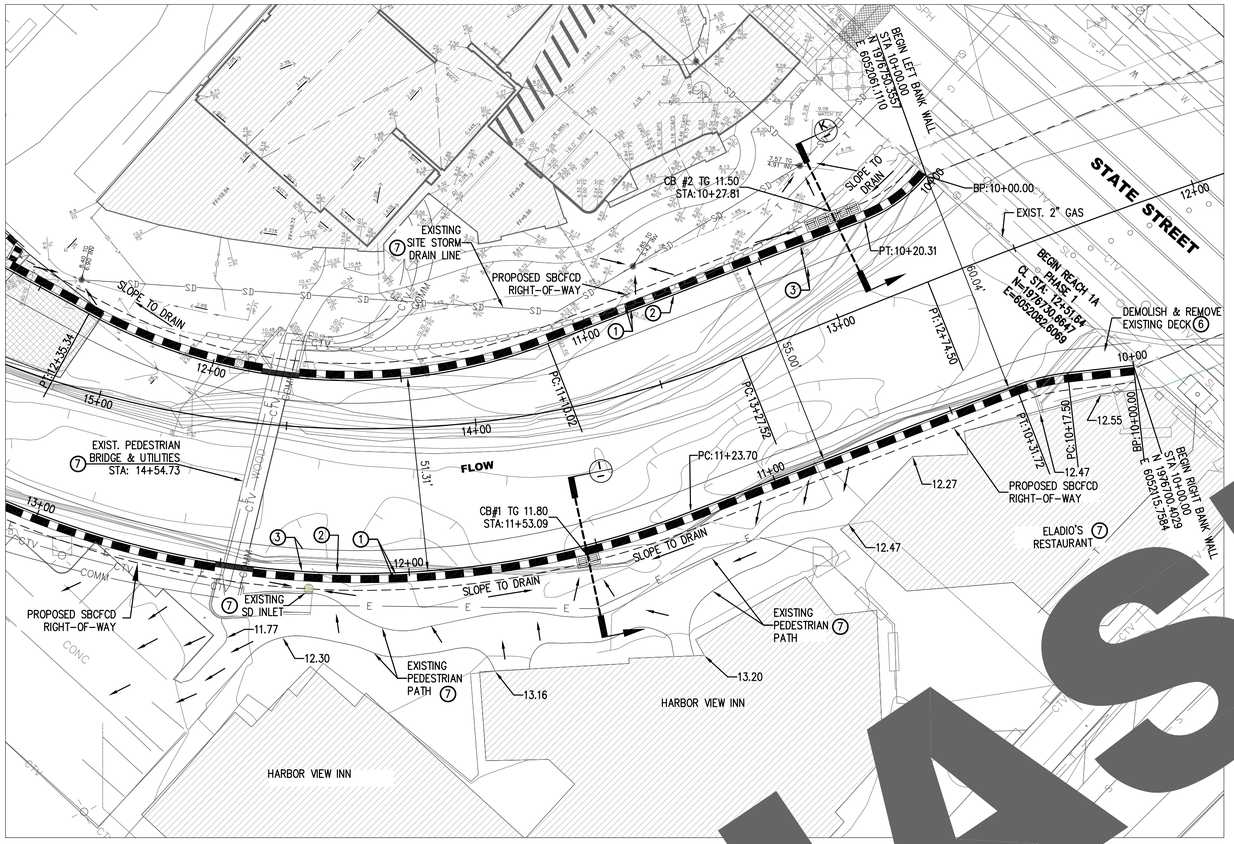
SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 1910CDT05-#11

DISTRICT FILE NO. 221/118
SPEC. NO.

SCALE AS SHOWN
SHEET 11 OF 22 SHEETS
D-5

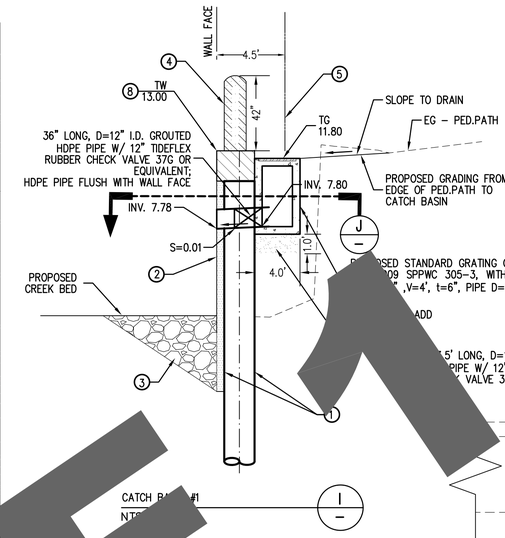
11/3/2010 4:47:45 PM



PROPOSED DRAINS THROUGH CREEK WALL – PLAN AND DETAILS

SCALE: 1"=10'

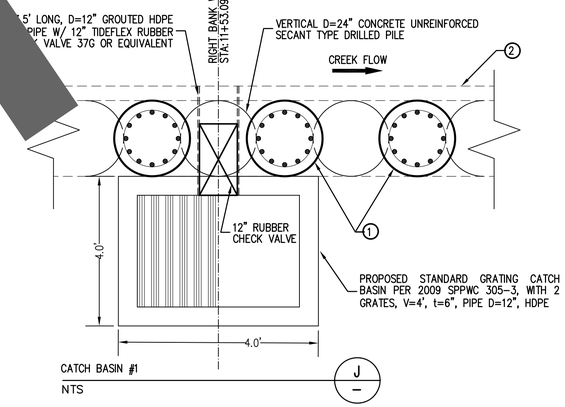
0 10 20 30



CATCH BASIN #1
NTS

CATCH BASIN #1 DESIGN PARAMETERS

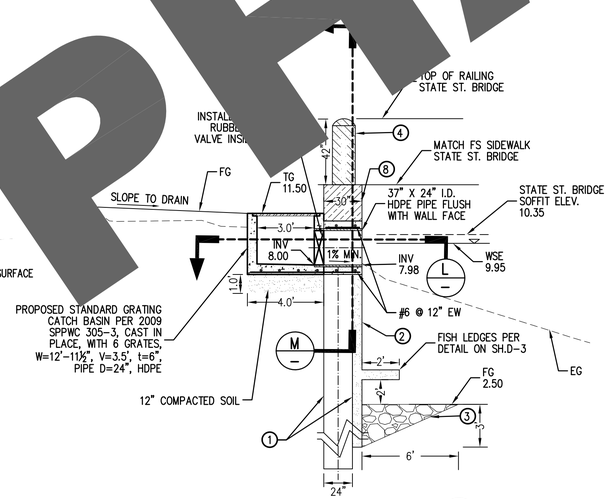
AREA SERVED, ACRES	0.041
RAIN INTENSITY, I/HR	3.5
RUNOFF COEF.	0.40
PEAK FLOW, CFS	0.057
SLOPE	0.01
12" DISCHARGE PIPE CAPACITY, CFS	3.8



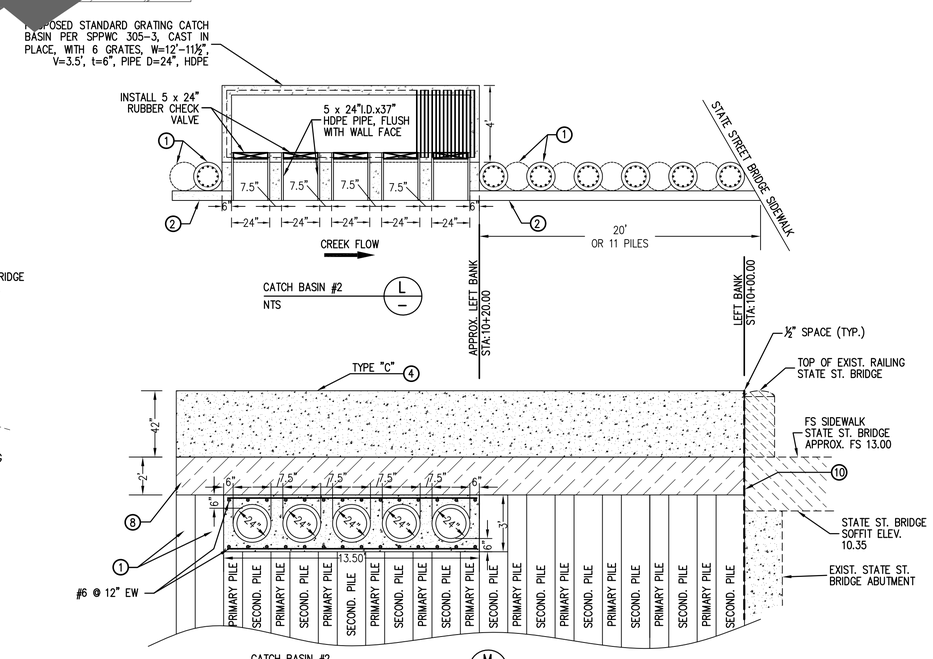
CATCH BASIN #1
NTS

CONSTRUCTION NOTES

1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D-4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPEC ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. CONSTRUCT 42" HAND RAIL, SEE SH.D-2.
5. CONSTRUCT 6' HIGH TEMPORARY SECURITY WOODEN (DOUGLAS FIR) FENCE AND GATES ALONG DEDICATED CONSTRUCTION EASEMENTS AND TEMPORARY STAGING AREAS AS APPROVED BY TH
6. DEMOLISH AND REMOVE. PULL EXISTING PILES & LAGGING. SEE SH.C-2.
7. PROTECT IN PLACE
8. CONSTRUCT 30"x24" REINFORCED BOND BEAM AS PER DETAILS ON SH.D-4.
9. NOT USED
10. PLACE BOND BREAKER BETWEEN THE END OF THE BOND BEAM AND ANY EXISTING CONCRETE SURFACE
11. NOT USED



CATCH BASIN #2
NTS



CATCH BASIN #2
NTS

NOTE

PROPOSED CHANNEL WIDTH IS TYPICALLY 55 FEET UNLESS OTHERWISE INDICATED HEREON; WALL HEIGHT IS APPROXIMATELY 10 FEET.

PHASE 1

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
PLAN & DETAILS – STORM DRAIN CATCH BASINS #1 & #2
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERD BY:
DEAN RYAN
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Tel. 213.487.1139
Fax. 213.487.1139

DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 1910CDT06–#12

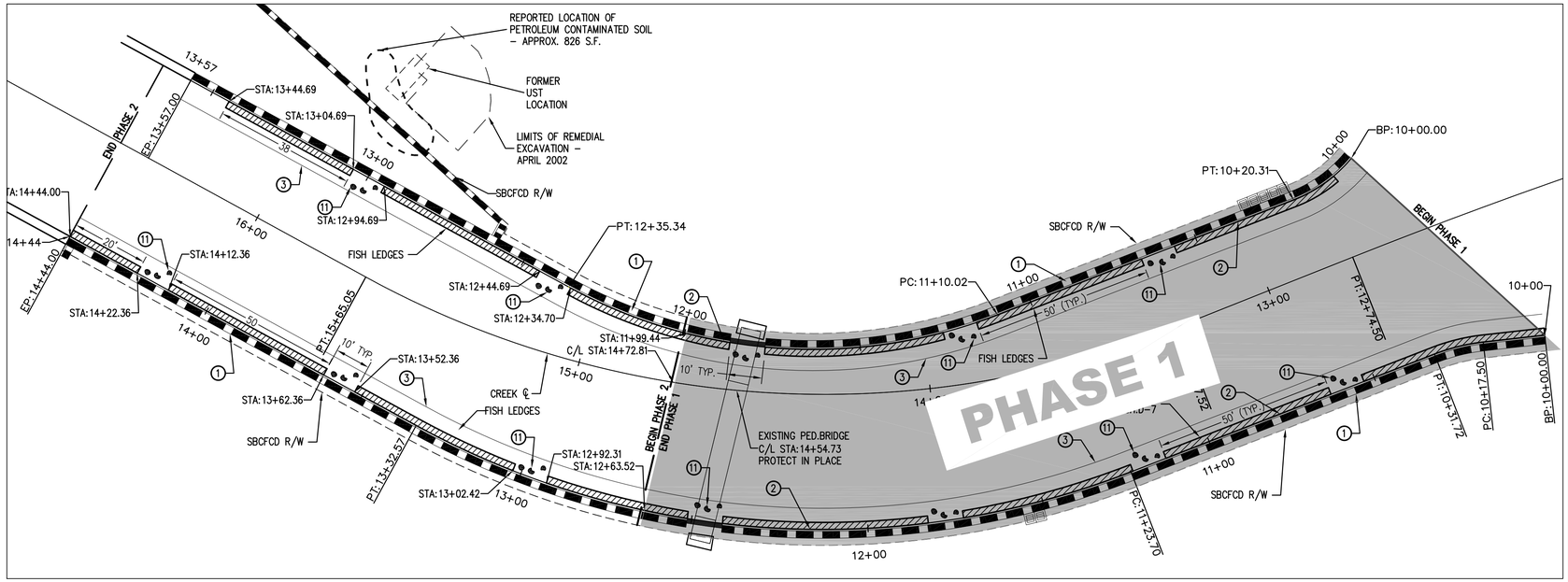
DISTRICT FILE NO. 221/119
SPEC. NO.

SCALE AS SHOWN

SHEET 12 OF 22 SHEETS

D–6

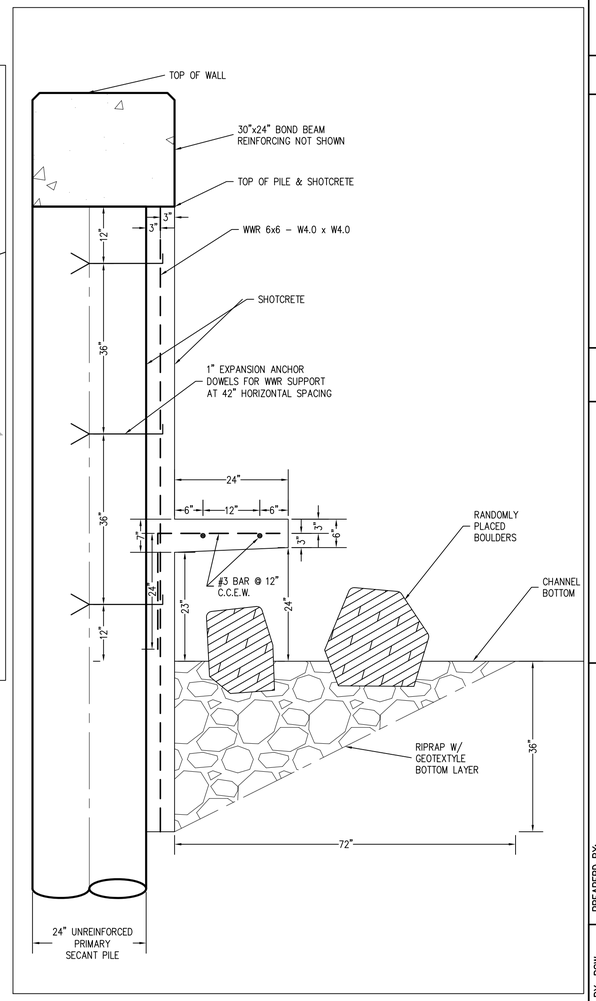
11/3/2010 4:49:20 PM



FISH LEDGES – PLAN

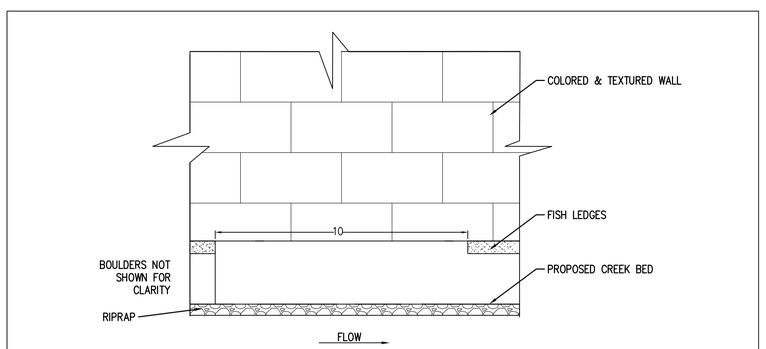
SCALE: 1"=20'

0 20 40 60



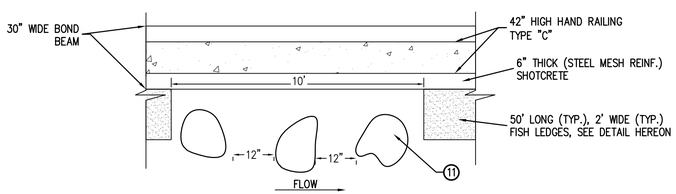
FISH FEATURES DETAIL

NTS



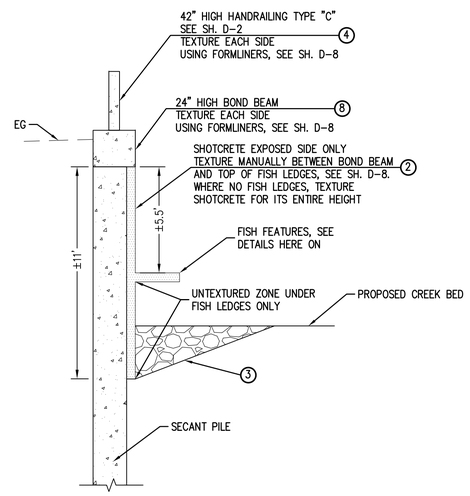
FISH LEDGES – ELEVATION VIEW

NTS



FISH LEDGES – PLAN VIEW

NTS



TEXTURE ZONES SECTION

NTS

CONSTRUCTION NOTES

1. CONSTRUCT VERTICAL 24" CONCRETE SECANT TYPE DRILLED PILE WALL USING CONTINUOUS FLIGHT AUGER, SEE SH.D-4.
2. APPLY 6" SHOTCRETE (STEEL MESH REINFORCED) OVER PILE SURFACE WATERSIDE. SANDBLAST PILES BEFORE SHOTCRETE .
3. CONSTRUCT RIPRAP REVETMENT W/ GEOTEXTILE LAYER PER CALTRANS STANDARD SPECS-SECTION 72; ROCK SIZE 75 LB, CLASS NO.2 GRADING OF ROCK SLOPE PROTECTION
4. CONSTRUCT 42" HAND RAIL, SEE SH.D-2.
5. NOT USED
6. NOT USED
7. NOT USED
8. CONSTRUCT 30"x24" REINFORCED BOND BEAM AS PER DETAILS ON SH.D-4.
9. NOT USED
10. NOT USED
11. INSTALL BOULDER CLUSTER. BOULDER SIZE 200+ POUND

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
PLAN & DETAILS
FISH LEDGES
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERD BY: DEAN RYAN CONSULTANTS & DESIGNERS, INC. 725 South Alameda Street, Suite 3320 Los Angeles, California 90017 Tel 213.687.1139 Fax 213.687.1139

DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT, LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: COL. R.MARK TOY, CHIEF, DESIGN BRANCH

FILE NAME: 191OD107-#13

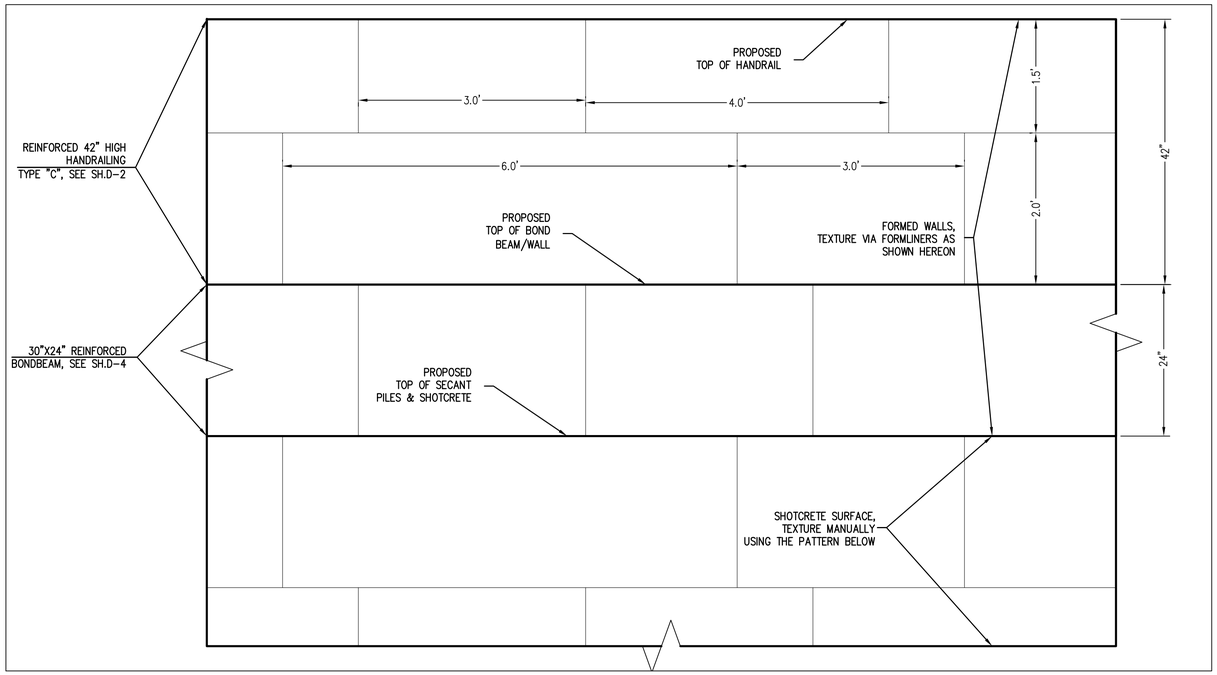
DISTRICT FILE NO. 221/120 SPEC. NO.

SCALE AS SHOWN

SHEET 13 OF 22 SHEETS

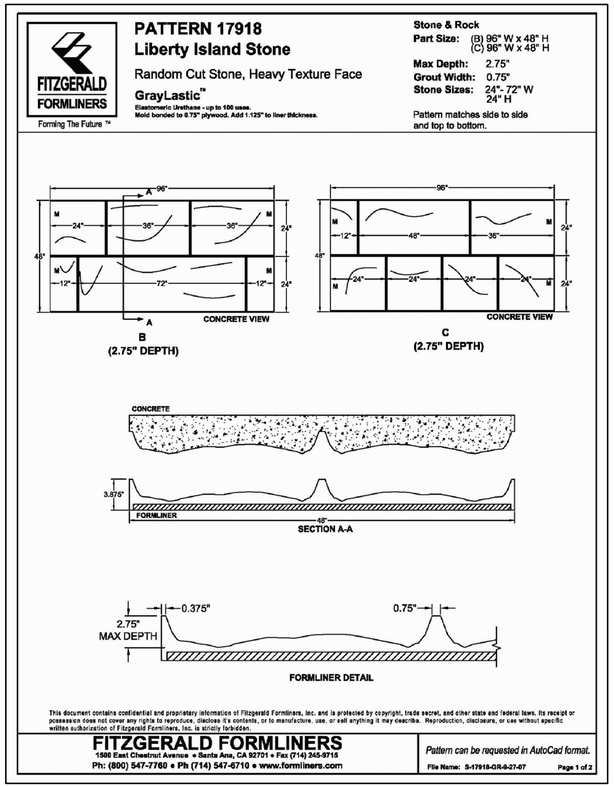
D-7

11/3/2010 4:50:44 PM



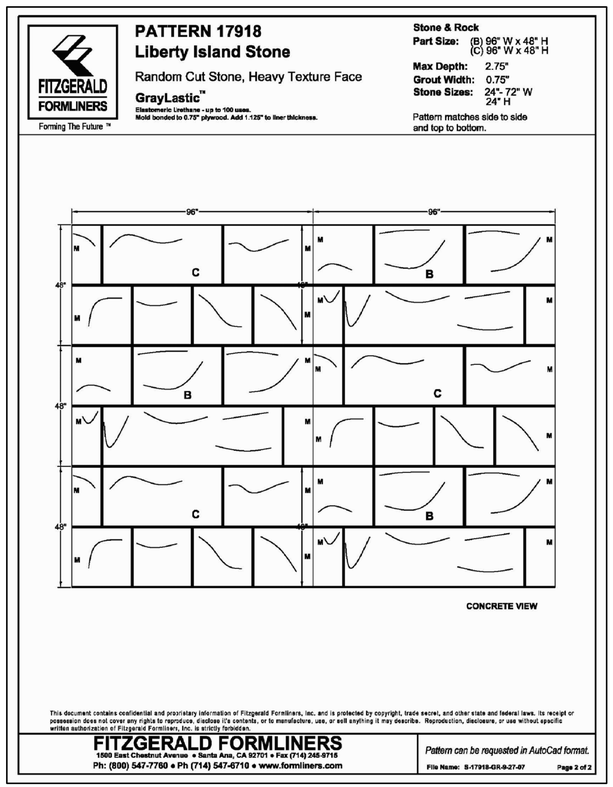
TYPICAL WALL TEXTURE PATTERN – ELEVATION VIEW

NTS



BOND BEAM AND HANDRAIL TEXTURE PATTERN DETAILS

NTS



SHOTCRETE TEXTURE PATTERN DETAILS

NTS

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2 – DETAILS
BOND BEAM, HANDRAIL &
SHOTCRETE TEXTURE
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERD BY:
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Los Angeles, California 90017
TEL 213.487.1139

DESIGNED BY: RSW
DRAWN BY: WMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

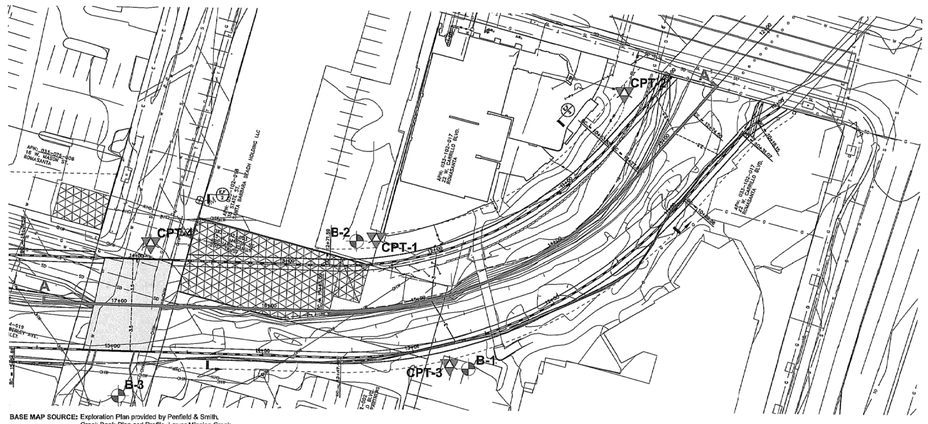
SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

DISTRICT FILE NO. 221/121
SPEC. NO.
FILE NAME: 1910CDT08-#14

SCALE AS SHOWN
SHEET 14 OF 22 SHEETS
D-8

11/3/2010 4:51:51 PM

Santa Barbara County Public Works
Project No. 3190.050



BASE MAP SOURCE: Exploration Plan provided by Penfield & Smith, Creek Bank Plan and Profile, Lower Mission Creek, (Sithets 4 and 5), dated 3/11/08.

LEGEND

B-3 — Approximate Drill Hole Location

CPT-4 — Approximate CPT Location

A A' — Cross Section A-A'

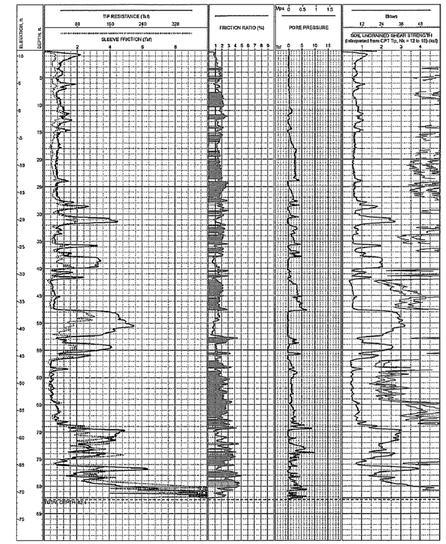
NORTH

0 40 80
FEET

SUBSURFACE EXPLORATION LOCATION PLAN
Lower Mission Creek Channel Improvements
Mason Street to State Street
Santa Barbara, California

PLATE 2

Santa Barbara County
Project No. 3190.050



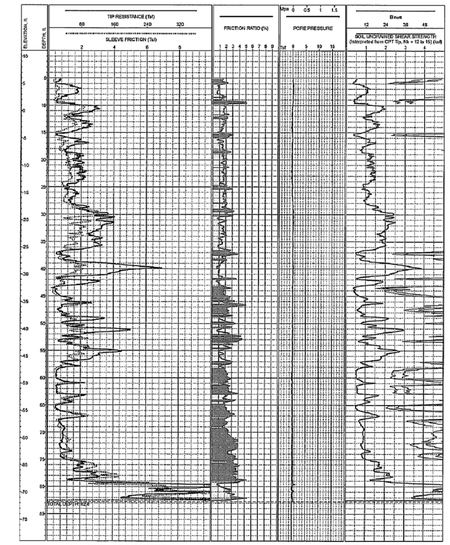
LOCATION: 1,978,743.51036N, 6,051,836.71099W
SURFACE EL: 11.08 +/- (MSL)
COMPLETION DEPTH: 82.4ft
TESTDATE: 12/4/2008

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Kehoe Testing
REVIEWED BY: G S Denlinger

LOG OF CPT NO: CPT-1
Lower Mission Creek Improvements
Santa Barbara County, California

PLATE A1

Santa Barbara County
Project No. 3190.050



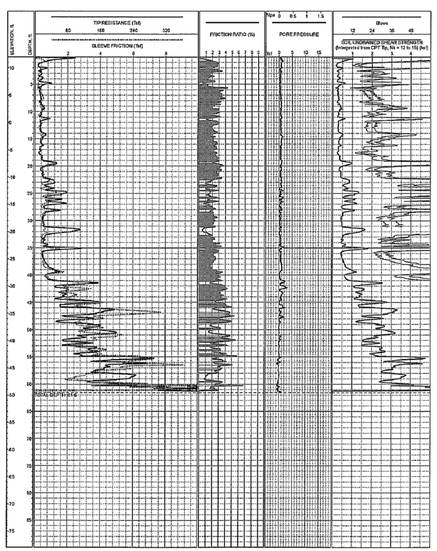
LOCATION: 1,978,755.28723N, 6,052,027.38830W
SURFACE EL: 11.08 +/- (MSL)
COMPLETION DEPTH: 82.6ft
TESTDATE: 12/4/2008

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Kehoe Testing
REVIEWED BY: G S Denlinger

LOG OF CPT NO: CPT-2
Lower Mission Creek Improvements
Santa Barbara County, California

PLATE A2

Santa Barbara County
Project No. 3190.050



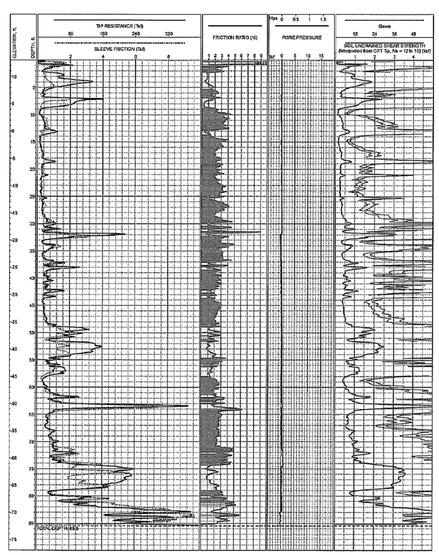
LOCATION: 1,978,646.51605N, 6,051,842.39295W
SURFACE EL: 12.08 +/- (MSL)
COMPLETION DEPTH: 81.6ft
TESTDATE: 12/4/2008

EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Kehoe Testing
REVIEWED BY: G S Denlinger

LOG OF CPT NO: CPT-3
Lower Mission Creek Improvements
Santa Barbara County, California

PLATE A3

Santa Barbara County
Project No. 3190.050



LOCATION: 1,978,808.21863N, 6,051,701.77179W
SURFACE EL: 13.08 +/- (MSL)
COMPLETION DEPTH: 85.5ft
TESTDATE: 12/4/2008

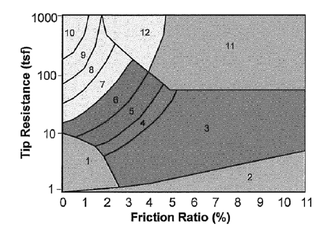
EXPLORATION METHOD: Cone Penetrometer
PERFORMED BY: Kehoe Testing
REVIEWED BY: G S Denlinger

LOG OF CPT NO: CPT-4
Lower Mission Creek Improvements
Santa Barbara County, California

PLATE A4

Santa Barbara County
Project No. 3190.050

COLOR LEGEND FOR FRICTION RATIO TRACES



Zone	Soil Behavior Type	U.S.C.S.
1	Sensitive Fine-grained	OL-CH
2	Organic Material	OL-OH
3	Clay	CH
4	Silty Clay to Clay	CL-CH
5	Clayey Silt to Silty Clay	MH-CL
6	Sandy Silt to Clayey Silt	ML-MH
7	Silty Sand to Sandy Silt	SM-ML
8	Sand to Silty Sand	SM-SP
9	Sand	SW-SP
10	Gravelly Sand to Sand	SW-GW
11	Very Stiff Fine-grained *	CH-CL
12	Sand to Clayey Sand *	SC-SM

*overconsolidated or cemented

CPT CORRELATION CHART
(Robertson and Campanella, 1984)

KEY TO CPT LOGS
Lower Mission Creek Improvements
Santa Barbara County, California

PLATE A5

11/3/2010 4:52:07 PM

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
CONE PENETROMETERS & BOREHOLES
LOCATION PLAN & LOGS
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERD BY:

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DESIGNED BY: RSW
DRAWN BY: WMM
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U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:
COL. R MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 1910CB01–#15

SCALE AS SHOWN

SHEET 15 OF 22 SHEETS

DISTRICT FILE NO. 221/122

SPEC. NO.

B–1

Santa Barbara County Public Works
Project No. 3190.050

FUGRO

LOCATION: Harbor View Inn Parking Lot, See Plate 2 - Subsurface Exploration Location Plan N 1,976,638 E 6,051,853 CA State Plane, Zone 5, NAD83, Feet
SURFACE EL: 12 ft +/- (rel. MSL datum)

Sample No.	Sampler Blow Count	Material Description	Unit Wet Weight, pcf	Unit Dry Weight, pcf	Water Content, %	% Passing #200 Sieve	Liquid Limit, %	Plasticity Index, %	Undrained Shear Strength, S_u, ksf
		ARTIFICIAL FILL (af) CONCRETE: ~9" thick concrete parking lot							
		Sandy CLAY (CL): stiff, dark yellowish brown, moist, fine sand with wood debris/chips							
1	(4)	**ALLUVIUM (Qal)** Lean CLAY (CL) with silt and sand lenses: soft, dusky brown, dry to moist, trace rootlets, with some silt and some fine sand - gray brown with moderate brown mottling, with fine sand pockets - dusky brown near ~6-1/2', higher plasticity, with brown mottling and trace fine rootlets	109	79	38				
2A 2B	(8)	- gravelly lean clay at ~9', medium stiff, olive gray	128 / 109	104 / 86	23 / 26		30	11	
3	push	Silty SAND (SM): very loose to loose, olive gray, wet, with light brown inclusions, fine to medium sand, trace rootlets and fine gravels - with trace shell fragments			30	38			
4	(13)	Sandy Lean CLAY (CL): stiff, black, wet, trace coarse sand and rootlets, less sand near ~15'	133	110	21	52			
5	23	Lean to Fat CLAY (CL to CH): very stiff, olive gray, wet, with rootlets - with woody debris and trace charcoal fragments			34		50	30	
6	(33)	Sandy SILT (ML): very stiff, olive gray, wet, with fine sand and trace organics			24	56			
7	16	Silty SAND (SM): medium dense, dark gray, wet, with fine to medium sand			27	46			
8A 8B	(31)		125	101	25 / 24	17			
9	4	Fat CLAY (CH): soft to medium stiff, olive gray to dark gray, wet, with woody debris and organics			34		54	32	p 0.8
10A 10B	(35)	Sandy CLAY (CL): very stiff, olive gray to dark gray, wet, with fine sand, trace organics and roots, possible older alluvium (Qoa)	134 / 135	114 / 115	16 / 17	53			

The log and data presented are a simplification of actual conditions encountered at the time of drilling at the drilled location. Subsurface conditions may differ at other locations and with the passage of time.

COMPLETION DEPTH: 67.0 ft
DEPTH TO WATER: Not Measured
BACKFILLED WITH: Cement/bentonite grout
DRILLING DATE: December 17, 2008
DRILLING METHOD: 4-inch-dia. Mud Rotary Wash
HAMMER TYPE: Automatic Trip
DRILLED BY: Gregg Drilling
LOGGED BY: K Nelson
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. DH-01 (B-1)
Lower Mission Creek Channel Improvements
Mason Street to State Street
Santa Barbara, California
PLATE A-6a

Santa Barbara County Public Works
Project No. 3190.050

LOCATION: Harbor View Inn Parking Lot, See Plate 2 - Subsurface Exploration Location Plan N 1,976,638 E 6,051,853 CA State Plane, Zone 5, NAD83, Feet
SURFACE EL: 12 ft +/- (rel. MSL datum)

Sample No.	Sampler Blow Count	Material Description	Unit Wet Weight, pcf	Unit Dry Weight, pcf	Water Content, %	% Passing #200 Sieve	Liquid Limit, %	Plasticity Index, %	Undrained Shear Strength, S_u, ksf
11	42	- becomes hard at ~43', greenish gray with light olive brown inclusions			23				
12	42	- dark green gray			24				
13	77	Clayey SAND (SC): very dense, dark greenish gray to dusky blue gray, wet, with fine sand, possible Santa Barbara Formation (Qsb)			18				
14	Ref/6"	- with fine angular to subangular gravel, less than ~1-1/4" diameter - gravel layer encountered during drilling at ~62'			16				
	Ref/4"								

COMPLETION DEPTH: 67.0 ft
DEPTH TO WATER: Not Measured
BACKFILLED WITH: Cement/bentonite grout
DRILLING DATE: December 17, 2008
DRILLING METHOD: 4-inch-dia. Mud Rotary Wash
HAMMER TYPE: Automatic Trip
DRILLED BY: Gregg Drilling
LOGGED BY: K Nelson
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. DH-01
Lower Mission Creek Channel Improvements
Mason Street to State Street
Santa Barbara, California
PLATE A-6b

Santa Barbara County Public Works
Project No. 3190.050

LOCATION: Empty Lot behind Former California Hotel, See Plate 2 - Subsurface Exploration Location Plan N 1,976,748 E 6,051,824 CA State Plane, Zone 5, NAD83, Feet
SURFACE EL: 11 ft +/- (rel. MSL datum)

Sample No.	Sampler Blow Count	Material Description	Unit Wet Weight, pcf	Unit Dry Weight, pcf	Water Content, %	% Passing #200 Sieve	Liquid Limit, %	Plasticity Index, %	Undrained Shear Strength, S_u, ksf
		ARTIFICIAL FILL (af) Silty SAND (SM): moderate brown, moist, fine to medium sand - sandy silt lens at ~3-1/2'							
1	(15)	**ALLUVIUM (Qal)** Sandy SILT (ML) with clay and sand lenses: stiff, gray brown to dark yellow brown, moist, with moderate brown mottling, fine to coarse sand, with some fine to medium, subangular gravel ~1" in diameter, with rust inclusions and rootlets in clay lens at ~5-1/2' - grades to silty clay at ~6-1/2', trace charcoal fragments	133	117	13	52			
2	(16)	Lean CLAY (CL): stiff, olive gray with trace rust inclusions, wet, trace pin-sized voids and fine rootlets, trace fine angular gravels	125	100	25		41	20	p 1.0 u 1.3
3A 3B	7	Silty SAND (SM) with sandy silt lenses: loose, olive gray with rust inclusions, wet, with clay pockets, few fine angular gravel ~1" diameter, fine sand			19 / 23	29			
4	100 psi	- clayey silty sand (SC-SM) at 14', dark greenish gray			36		41	22	
		Gravelly to Sandy Lean CLAY (CL): wet, gravelly clay at ~14.6', dark gray, w/ trace rootlets, fine angular gravel - sandy clay with gravel at ~15', gray black							
5A 5B	(7)	- lean clay at ~19', medium stiff, trace rootlets	119	90	37 / 32				
6	push	- lean clay at 20-1/2', soft, trace fine gravel			29		36	17	
7	200 psi	- lean clay with sand and gravel at ~25', greenish black - clayey sand lens at ~25.6', olive gray w/ rust mottling - gravelly clay near ~26', dark gray - lens of well-graded sand with silt at ~26-1/2'							
8	16	Clayey SAND (SC): dark gray with olive brown inclusions, wet, fine sand			26	66			
		Sandy SILT (ML) to Sandy CLAY (CL): stiff, dark gray, wet, fine sand, sandy silt, trace clay pockets, possible older alluvium (Qoa)							
9A 9B	(32)	- grades to sandy clay near 35-1/2' - silty clay lens at ~36', dark olive gray, trace rootlets	124 / 125	99 / 98	26 / 28	97			
	(29)	Silty SAND (SM): medium dense, wet, fine sand, dark gray							

COMPLETION DEPTH: 101.5 ft
DEPTH TO WATER: 6.8 ft
BACKFILLED WITH: Cement/bentonite grout
DRILLING DATE: December 19, 2008
DRILLING METHOD: 4-inch-dia. Mud Rotary Wash
HAMMER TYPE: Automatic Trip
DRILLED BY: Gregg Drilling
LOGGED BY: K Nelson
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. DH-02 (B-2)
Lower Mission Creek Channel Improvements
Mason Street to State Street
Santa Barbara, California
PLATE A-7a

Santa Barbara County Public Works
Project No. 3190.050

LOCATION: Empty Lot behind Former California Hotel, See Plate 2 - Subsurface Exploration Location Plan N 1,976,748 E 6,051,824 CA State Plane, Zone 5, NAD83, Feet
SURFACE EL: 11 ft +/- (rel. MSL datum)

Sample No.	Sampler Blow Count	Material Description	Unit Wet Weight, pcf	Unit Dry Weight, pcf	Water Content, %	% Passing #200 Sieve	Liquid Limit, %	Plasticity Index, %	Undrained Shear Strength, S_u, ksf
10		Silty CLAY with sand (CL-ML): stiff, dark gray, wet, with charcoal pieces and black spotting	125	95	30				
11	13	- grades to lean clay with sand at ~44', with very trace rootlets and light gray inclusions			25	77			
12	(70)	Silty SAND (SM): dense, dark gray, wet, fine sand becomes fine to coarse sand near ~50-1/2' with some fine gravels	130	105	23				
13A 13B	13	Fat CLAY (CH): stiff, olive gray to dark gray, wet, with abundant charcoal staining and trace rootlets - turns to silt at ~55', with trace fine sand			50 / 31	90	66	41	
14A 14B	(28)	Lean CLAY with sand (CL): dark gray to dark blue gray, wet, fine sand - very stiff, fine sand, trace medium sand and silt near ~59'							p 1.8
15	23	- dusky yellow with gray mottling, trace rootlets, very fine sand			30	84	34	14	
16 17	(87) 42	**OLDER ALLUVIUM (Qoal) ??** Silty SAND (SM): dense to very dense, light gray with pockets of yellow orange and green gray inclusions, wet, fine sand, possible Santa Barbara Formation (Qsb)	130	108	21 / 27				

COMPLETION DEPTH: 101.5 ft
DEPTH TO WATER: 6.8 ft
BACKFILLED WITH: Cement/bentonite grout
DRILLING DATE: December 19, 2008
DRILLING METHOD: 4-inch-dia. Mud Rotary Wash
HAMMER TYPE: Automatic Trip
DRILLED BY: Gregg Drilling
LOGGED BY: K Nelson
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. DH-02
Lower Mission Creek Channel Improvements
Mason Street to State Street
Santa Barbara, California
PLATE A-7b

Santa Barbara County Public Works
Project No. 3190.050

LOCATION: Empty Lot behind Former California Hotel, See Plate 2 - Subsurface Exploration Location Plan N 1,976,748 E 6,051,824 CA State Plane, Zone 5, NAD83, Feet
SURFACE EL: 11 ft +/- (rel. MSL datum)

Sample No.	Sampler Blow Count	Material Description	Unit Wet Weight, pcf	Unit Dry Weight, pcf	Water Content, %	% Passing #200 Sieve	Liquid Limit, %	Plasticity Index, %	Undrained Shear Strength, S_u, ksf
18A 18B	124/9"	- with few gravels near ~81-1/2', abundant rust coloring	131	111	18 / 13				
19	(68/6")	- light gray to greenish gray							
20	90	- yellow gray with few rust spottings, fine sand							

COMPLETION DEPTH: 101.5 ft
DEPTH TO WATER: 6.8 ft
BACKFILLED WITH: Cement/bentonite grout
DRILLING DATE: December 19, 2008
DRILLING METHOD: 4-inch-dia. Mud Rotary Wash
HAMMER TYPE: Automatic Trip
DRILLED BY: Gregg Drilling
LOGGED BY: K Nelson
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. DH-02
Lower Mission Creek Channel Improvements
Mason Street to State Street
Santa Barbara, California
PLATE A-7c

Santa Barbara County Public Works
Project No. 3190.050

LOCATION: West Side of Mason Street Bridge, See Plate 2 - Subsurface Exploration Location Plan N 1,976,728 E 6,051,636 CA State Plane, Zone 5, NAD83, Feet
SURFACE EL: 14 ft +/- (rel. MSL datum)

Sample No.	Sampler Blow Count	Material Description	Unit Wet Weight, pcf	Unit Dry Weight, pcf	Water Content, %	% Passing #200 Sieve	Liquid Limit, %	Plasticity Index, %	Undrained Shear Strength, S_u, ksf
		ARTIFICIAL FILL (af) AC over concrete							
		SILT (ML) to Silty SAND (SM): dark yellowish brown to pale brown, moist, fine sand							
		ALLUVIUM (Qal) Sandy CLAY (CL): gray brown, moist, with abundant rootlets and light gray mottling							
1	(3)	Silty SAND (SM): very loose, moderate brown, moist to wet	128	105	22				
2	(10)	Lean CLAY with sand (CL): medium stiff, blue gray, wet, with fine sand at ~10', light gray mottling, rust inclusions, organics and charcoal bits	124	97	27				
3	(15)	- becomes stiff at ~15', with fine charcoal and rootlets, blue gray to olive gray, becomes silty near ~16-1/2	130	109	20				p 1.5 u 1.0
4	(15)	- grades to lean clay at ~20'	117	84	39	90			
5	(26)	Sandy CLAY (CL) to Sandy SILT (ML): very stiff, blue gray, fine sand, sandy clayey silt at ~25', with fine sand lenses at ~26', possible older alluvium (Qoa)	131	107	23				u 2.1
6	(27)	- sandy clay at ~30', dark olive gray, fine sand, with silty fine sand lens near ~31-1/2'	131	107	22				
7	(30)	- sandy silt at ~35'	124	98	26	54			

COMPLETION DEPTH: 71.5 ft
DEPTH TO WATER: Not Measured
BACKFILLED WITH: Cement/bentonite grout
DRILLING DATE: December 22, 2008
DRILLING METHOD: 4-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Gregg Drilling
LOGGED BY: K Nelson
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. DH-03 (B-3)
Lower Mission Creek Channel Improvements
Mason Street to State Street
Santa Barbara, California
PLATE A

Santa Barbara County Public Works
Project No. 3190.050

LOCATION: West Side of Mason Street Bridge, See Plate 2 - Subsurface Exploration Location Plan N 1,976,728 E 6,051,636 CA State Plane, Zone 5, NAD83, Feet
SURFACE EL: 14 ft +/- (rel. MSL datum)

Sample No.	Sampler Blow Count	Material Description	Unit Wet Weight, pcf	Unit Dry Weight, pcf	Water Content, %	% Passing #200 Sieve	Liquid Limit, %	Plasticity Index, %	Undrained Shear Strength, S_u, ksf
8	(28)	- grades to lean clay at ~40', with trace charcoal, rootlets, and dark olive green mottling, higher plasticity	128	104	23				p 1.5
9	(41)	- sandy silt at ~45'	131	109	20				
10	21	- dark blue gray to olive gray, with rootlets, trace medium sand				63			
11	40	- sandy silt lens near ~60' **OLDER ALLUVIUM (Qoal) ??** Lean CLAY (CL): hard, gray green			26	97			
	31	- with fine sand at ~70', green gray with rusty brown inclusions			41				

COMPLETION DEPTH: 71.5 ft
DEPTH TO WATER: Not Measured
BACKFILLED WITH: Cement/bentonite grout
DRILLING DATE: December 22, 2008
DRILLING METHOD: 4-inch-dia. Hollow Stem Auger
HAMMER TYPE: Automatic Trip
DRILLED BY: Gregg Drilling
LOGGED BY: K Nelson
CHECKED BY: G S Denlinger

LOG OF DRILL HOLE NO. DH-03
Lower Mission Creek Channel Improvements
Mason Street to State Street
Santa Barbara, California
PLATE A-

Santa Barbara County Public Works
Project No. 3190.050

LOCATION: The drill hole location referencing local landmarks or coordinates
SURFACE EL: Using local, MSL, MLLW or other datum

Sample No.	Blow Count / Rec'/Drive"	Material Description	
1	25	Well graded GRAVEL (GW)	COARSE GRAINED
2	(25)	Poorly graded GRAVEL (GP)	
3	(25)	Well graded SAND (SW)	
		Poorly graded SAND (SP)	
4	(25)	Silty SAND (SM)	
5	18"/30"	Clayey SAND (SC)	
6		Silty, Clayey SAND (SC-SM)	
		Elastic SILT (MH)	FINE GRAINED
7		SILT (ML)	
8	20"/24"	Silty CLAY (CL-ML)	
9	(25)	Fat CLAY (CH)	
		Lean CLAY (CL)	
10	30"/30"	CONGLOMERATE	ROCK
11	20"/24"	SANDSTONE	
12		SILTSTONE	
13		MUDSTONE	
		CLAYSTONE	
		BASALT	
		ANDESITE BRECCIA	
		Paving and/or Base Materials	

General Notes

Soil Texture Symbol

Sloped line in symbol column indicates transitional boundary

Samplers and sampler dimensions (unless otherwise noted in report text) are as follows:

Symbol for:
1. SPT Sampler, driven 1-3/8" ID, 2" OD
2. CA Liner Sampler, driven 2-3/8" ID, 3" OD
3. CA Liner Sampler, disturbed 2-3/8" ID, 3" OD
4. Thin-walled Tube, pushed 2-7/8" ID, 3" OD
5. Bulk Bag Sample (from cuttings)
6. CA Liner Sampler, Bagged
7. Hand Auger Sample
8. CME Core Sample
9. Pitcher Sample
10. Lexan Sample
11. Vibracore Sample
12. No Sample Recovered
13. Sonic Soil Core Sample

Sampler Driving Resistance

Number of blows with 140 lb. hammer, falling 30" to drive sampler 1 ft. after seating sampler 6"; for example,

Blows/ft	Description
25	25 blows drove sampler 12" after initial 6" of seating
86/11"	After driving sampler the initial 6" of seating, 36 blows drove sampler through the second 6" interval, and 50 blows drove the sampler 5" into the third interval
50/6"	50 blows drove sampler 6" after initial 6" of seating
Ref/3"	50 blows drove sampler 3" during initial 6" seating interval

Blow counts for California Liner Sampler shown in ( )

Length of sample symbol approximates recovery length

Classification of Soils per ASTM D2487 or D2488

Geologic Formation noted in bold font at the top of interpreted interval

Strength Legend
- Q = Unconfined Compression
- u = Unconsolidated Undrained Triaxial
- t = Torvane
- p = Pocket Penetrometer
- m = Miniature Vane

Water Level Symbols
- Initial or perched water level
- Final ground water level
- Seepages encountered

Rock Quality Designation (RQD) is the sum of recovered core pieces greater than 4 inches divided by the length of the cored interval.

KEY TO TERMS & SYMBOLS USED ON LOGS
PLATE A-9

SYMBOL	0
DESCRIPTIONS	FINAL SUBMITTAL
DATE	10/01/10
APPROVAL	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
BOREHOLES LOGS
CITY OF SANTA BARBARA, CALIFORNIA

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DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 1910CB02-#16
SPEC. NO.
DISTRICT FILE NO. 221/123

SCALE AS SHOWN
SHEET 16 OF 22 SHEETS
B-2

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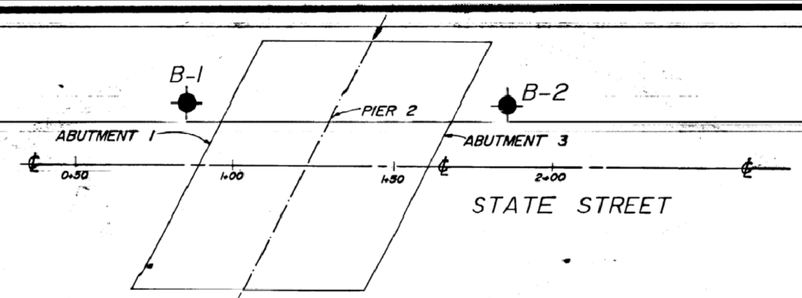
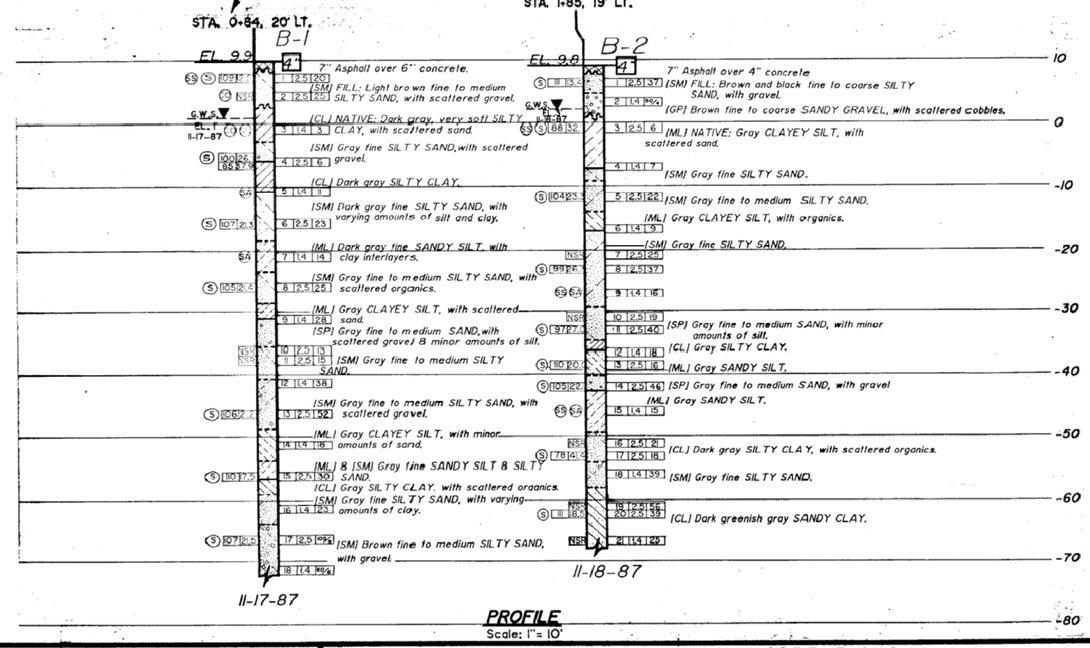


PLAN
Scale: 1" = 20'

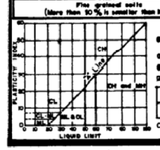


PROFILE
Scale: 1" = 10'

LEGEND OF EARTH MATERIALS

UNIFIED SOIL CLASSIFICATION

Pt	OH	CH	MH	OL	CL	ML	SC	SM	SP	SW	GC	GM	GP	GW
Highly organic soils	Silts and clays Liquid limit greater than 50			Silts and clays Liquid limit less than 50			Sands with fines >12% fines		Clean sands <5% fines		Gravels with fines >12% fines		Clean gravels <5% fines	
							Sands - more than 50% of coarse fraction is smaller than No 4 sieve.				Gravels - more than 50% of coarse fraction is larger than No 4 sieve.			
Fine grained soils (More than 50% is smaller than No 200 sieve)							Coarse grained soils (More than 50% is larger than No 200 sieve)							



LABORATORY CLASSIFICATION CRITERIA

GW and SW - $C_u = \frac{D_{60}}{D_{10}}$ greater than 4 for GW & 6 for SW; $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 & 3.

GP and SP - Clean gravel or sand not meeting requirements for GW and SW.

GM and SM - Atterberg limits below "A" line or P.I. less than 4.

GC and SC - Atterberg limits above "A" line with P.I. greater than 7.

Fines (silt or clay)	Fine sand	Medium sand	Coarse sand	Fine gravel	Coarse gravel	Cobbles	Boulders
Sieve sizes	#200 #40	#10	#4	3/4"	3"	12"	

Classification of earth materials shown on this sheet is based on field inspection and should not be construed to imply laboratory analysis unless as stated.

MATERIAL SYMBOLS

Gravel; Sand; Silt; Clay; Sandy clay or clayey sand; Sandy silt or silty sand; Silty clay or clayey silt; Peat or organic matter; Fill material; Shale; Sandstone; Limestone; Metamorphic rock; Igneous rock

CONSISTENCY CLASSIFICATION FOR SOILS

According to the Standard Penetration Test

Nº of blows	Granular	Cohesive
0-5	Very loose	Very soft
6-10	Loose	Soft
11-20	Semicompact	Stiff
21-35	Compact	Very stiff
36-70	Dense	Hard
>70	Very dense	Very hard

LEGEND OF BORING OPERATIONS

Plan of any boring; Rotary boring; Diamond core boring; Auger boring; Sample boring; Jet boring; Test pit; 2¼" Cone penetrometer; 2½" Cone penetrometer

ROTARY BORING

Location; Top hole elev.; Casing Set; Elevation Date; Date of boring

Moisture (% dry wt.); Dry density (lbs./cu.ft.); Unconfined compressive strength (tons/sq.ft.); Designates other soils tests: C - Consolidation, S - Direct shear, E - Expansion, T - Triaxial compression

SS - Soluble sulphate; CO - Corrosivity; NSR - No sample recovered

Sample number; Size of sample (inches); Blows per foot (Using a 140 lb. hammer with a 30" drop); Conformable material change; Approximate material change; Unconformable material change

THESE BORING LOG SUMMARIES APPLY ONLY AT THE TIME AND LOCATION INDICATED. SUBSURFACE CONDITIONS MAY DIFFER AT OTHER LOCATIONS AND TIMES.

PENETRATION TEST

Location; B-No.; Top hole elev.; Pushed; Blows per foot (Using 140 lb. hammer with 30" drop); Graphic representation of driving rate; Date; Blows per foot

MOORE & TABER
CONSULTING ENGINEERS AND GEOLOGISTS
Approved George P. Hattrup
REGISTERED GEOTECHNICAL ENGINEER No.
JOB No. 187-1136A

CITY OF SANTA BARBARA

STATE STREET BRIDGE REPLACEMENT
OVER MISSION CREEK
SANTA BARBARA, CALIFORNIA

LOG OF TEST BORINGS

Scale Horiz.- 1"=20' Vert.-1"=10 | Date REVISED 5-18-90 | By R.W.K. | Check by D.L.C. | Drawing B6 of B6

C-3-674

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A - LOWER MISSION CREEK
PHASE 2
BOREHOLES LOGS
AT STATE ST. BRIDGE
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERD BY: DEAN RYAN CONSULTANTS & DESIGNERS, INC. 22 Pasadena Avenue, Suite 3320, Los Angeles, California 90017, Tel 213.687.1130, Fax 213.687.1139

DESIGNED BY: RSW
DRAWN BY: YAM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY: COL. R.MARK TOY, CHIEF, DESIGN BRANCH

FILE NAME: 1910C803-#17

DISTRICT FILE NO. 221/124 | SPEC. NO.

SCALE AS SHOWN | SHEET 17 OF 22 SHEETS

B-3

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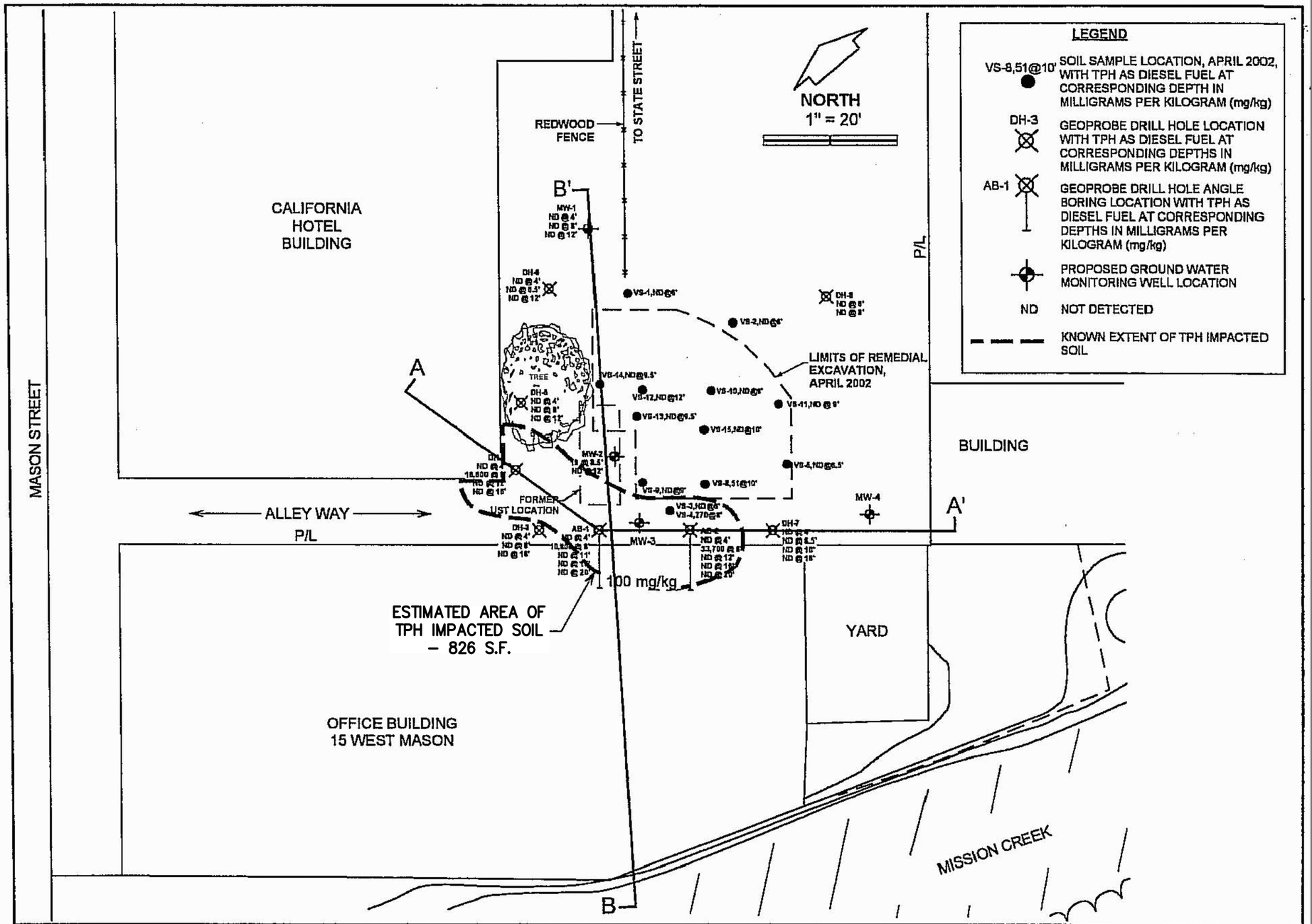
February 2003
Project No. 0101-1182



padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS
35 State Street - Santa Barbara, CA

SITE PLAN SHOWING KNOWN EXTENT OF TPH IMPACTED SOIL
PLATE 5

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
REPORTED PETROLLEUM CONTAMINATED AREA – PLATE 5
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERED BY:
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U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 1910CB04-#18

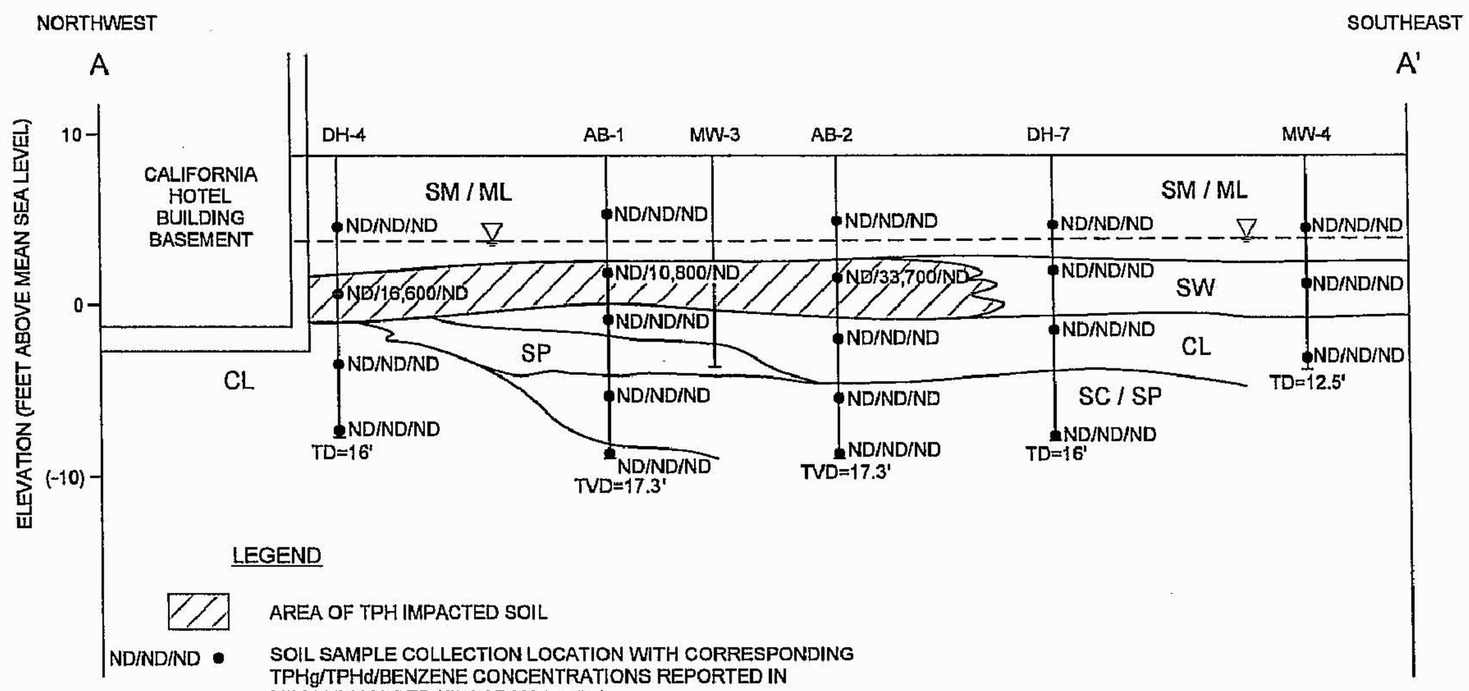
DISTRICT FILE NO. 221/125
SPEC. NO.

SCALE AS SHOWN
SHEET 18 OF 22 SHEETS

B-4

11/3/2010 4:52:39 PM

February 2003
Project No. 0101-1182



LEGEND

	AREA OF TPH IMPACTED SOIL
ND/ND/ND ●	SOIL SAMPLE COLLECTION LOCATION WITH CORRESPONDING TPHg/TPHd/BENZENE CONCENTRATIONS REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg)
▽	GROUNDWATER TABLE
TPHg	TOTAL PETROLEUM HYDROCARBONS GASOLINE RANGE
TPHd	TOTAL PETROLEUM HYDROCARBONS DIESEL FUEL RANGE
ND	NOT DETECTED
TD	TOTAL DEPTH
TVD	TRUE VERTICAL DEPTH

CL	CLAY
SM	SILTY SAND
ML	SILT
SW	SAND, WELL GRADED
SP	SAND, POORLY GRADED
SC	CLAYEY SAND

SCALE: 1" = 10'

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS
35 State Street - Santa Barbara, CA

ELEVATION CROSS-SECTION A-A'
PLATE 6

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
REPORTED PETROLLEUM CONTAMINATED AREA – PLATE 6
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERED BY:
DEAN RYAN
CONSULTANTS & DESIGNERS, INC.
725 South Figueroa Street, Suite 3320
Los Angeles, California 90017
Tel. 213.687.1139
Fax. 213.687.1139

DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

FILE NAME: 1910CB05-#19

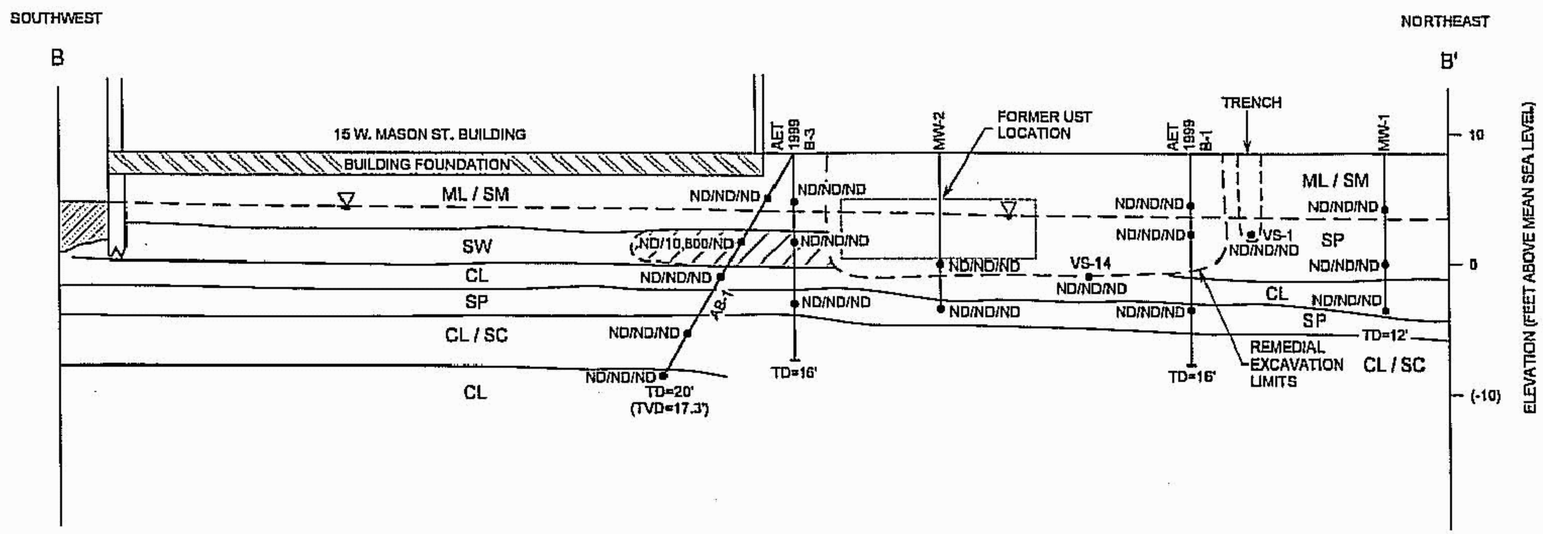
DISTRICT FILE NO. 221/126
SPEC. NO.

SCALE AS SHOWN
SHEET 19 OF 22 SHEETS

B-5

11/3/2010 4:52:44 PM

February 2003
Project No. 0101-1162



LEGEND

▨	AREA OF TPH IMPACTED SOIL
ND/ND/ND ●	SOIL SAMPLE COLLECTION LOCATION WITH CORRESPONDING TPHg/TPHd/BENZENE CONCENTRATIONS REPORTED IN MILLIGRAMS PER KILOGRAM (mg/kg)
▽	GROUNDWATER TABLE
TPHg	TOTAL PETROLEUM HYDROCARBONS GASOLINE RANGE
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CL	CLAY
SM	SILTY SAND
ML	SILT
SW	SAND, WELL GRADED
SP	SAND, POORLY GRADED
SC	CLAYEY SAND

SCALE: 1" = 10'

padre associates, inc.
ENGINEERS, GEOLOGISTS & ENVIRONMENTAL SCIENTISTS
35 State Street - Santa Barbara, CA

ELEVATION CROSS-SECTION B-B'
PLATE 7

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK
PHASE 2
REPORTED PETROLEUM CONTAMINATED AREA – PLATE 7
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERD BY: DEAN RYAN CONSULTANTS & DESIGNERS, INC.
DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT, LOS ANGELES
CORPS OF ENGINEERS

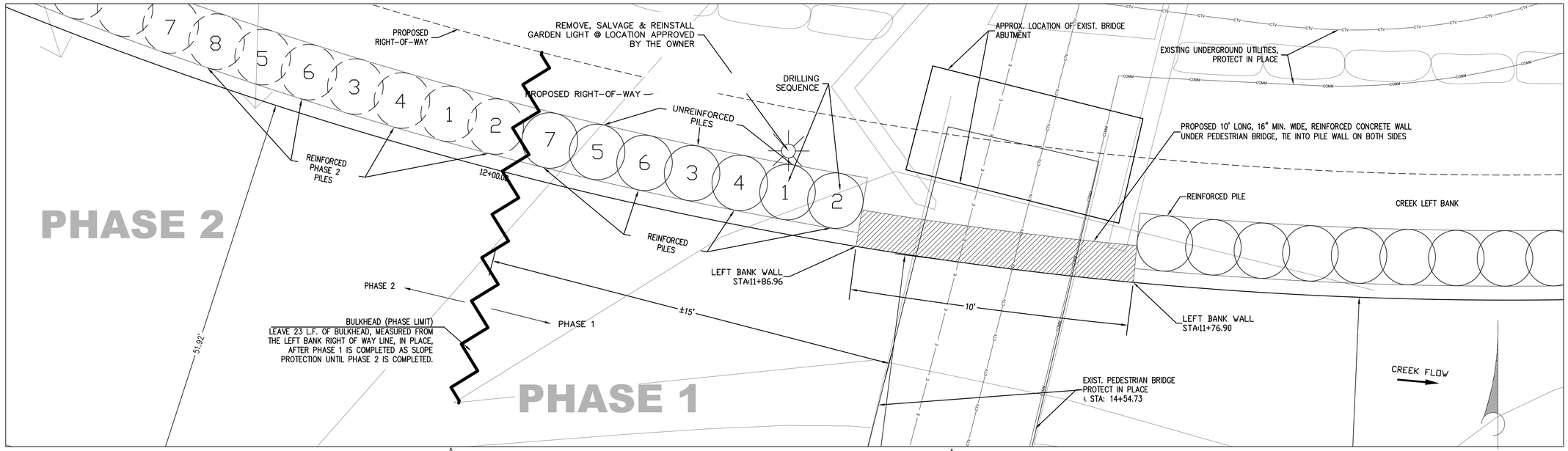
SUBMITTED BY: COL. R.MARK TOY, CHIEF, DESIGN BRANCH

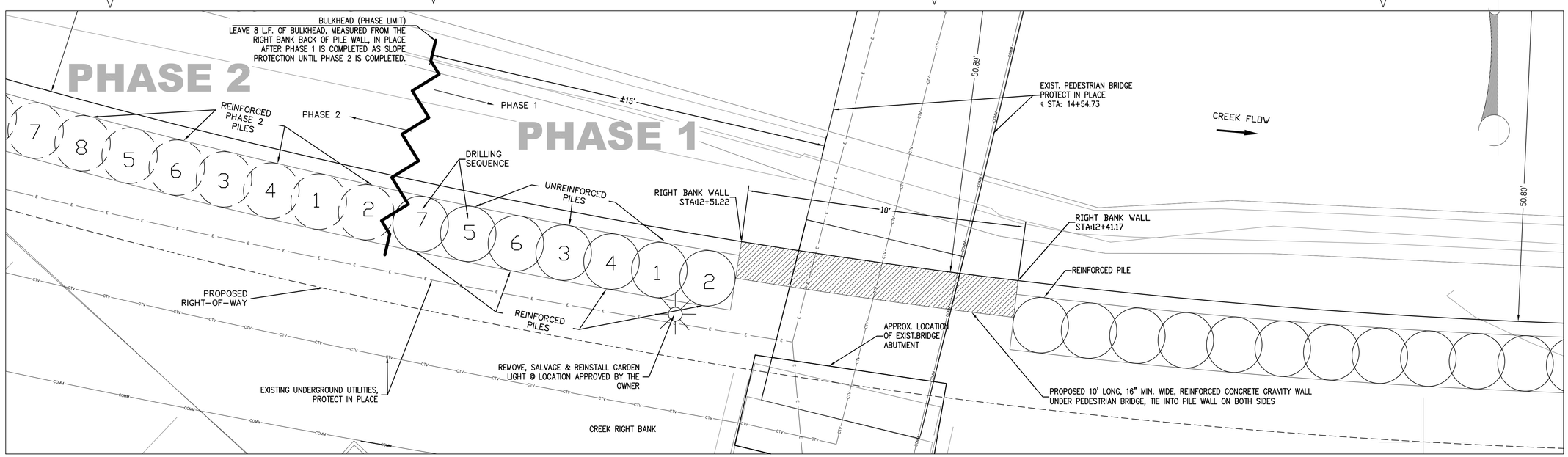
FILE NAME: 1910Q806-#20

SCALE AS SHOWN | SHEET 20 OF 22 SHEETS | DISTRICT FILE NO. 221/127 | SPEC. NO.

B-6

11/3/2010 4:52:55 PM





NOTES:

1. PROPOSED CHANNEL WIDTH IS TYPICALLY 55 FEET UNLESS OTHERWISE INDICATED HEREON; WALL HEIGHT IS APPROXIMATELY 10 FEET.

2. SBCFCD SURVEYORS SHALL INSTALL SURVEY MONUMENTS ON THE TOPS OF BOTH THE RIGHT BANK WALL AND THE LEFT BANK WALL FOR PURPOSES OF MONITORING SETTLEMENT AND MOVEMENT OF THE TOPS OF THE WALLS. THE MONUMENTS SHALL BE PLACED ON THE TOPS OF THE BOND BEAMS NOT THE HANDRAILS. THE AS-BUILT ELEVATIONS AND THE COORDINATE LOCATION OF EACH MONUMENT SHALL BE RECORDED FOR FUTURE REFERENCE. IN ORDER TO BE ABLE TO MEASURE ALL MOVEMENT, THE MONUMENTS SHOULD BE SET AFTER THE CONCRETE IN THE PILES AND IN THE BOND BEAM HAS GAINED ITS STRENGTH AND BEFORE THE CHANNEL EXCAVATION IS DONE IN FRONT OF THE WALL. THE MONUMENTS SHOULD BE SPACED ABOUT 100 FEET APART. THERE SHOULD BE A SURVEY MONUMENT AT THE END OF EACH WALL NEAR THE STATE STREET BRIDGE AND ONE UPSTREAM OF THE PEDESTRIAN BRIDGE IN THE PHASE ONE WALL."

PHASE 1/PHASE 2 WALL TRANSITION - PLAN

SCALE: 1"=2'

0 2 4 6

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A - LOWER MISSION CREEK
PHASE 2
WALL TRANSITION PLAN
CITY OF SANTA BARBARA, CALIFORNIA

PREAPERED BY:
DEAN RYAN CONSULTANTS & DESIGNERS, INC.
Tel 213.687.1139

DESIGNED BY: RSW
DRAWN BY: VMM
CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT, LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:
COL. R.MARK TOY
CHIEF, DESIGN BRANCH

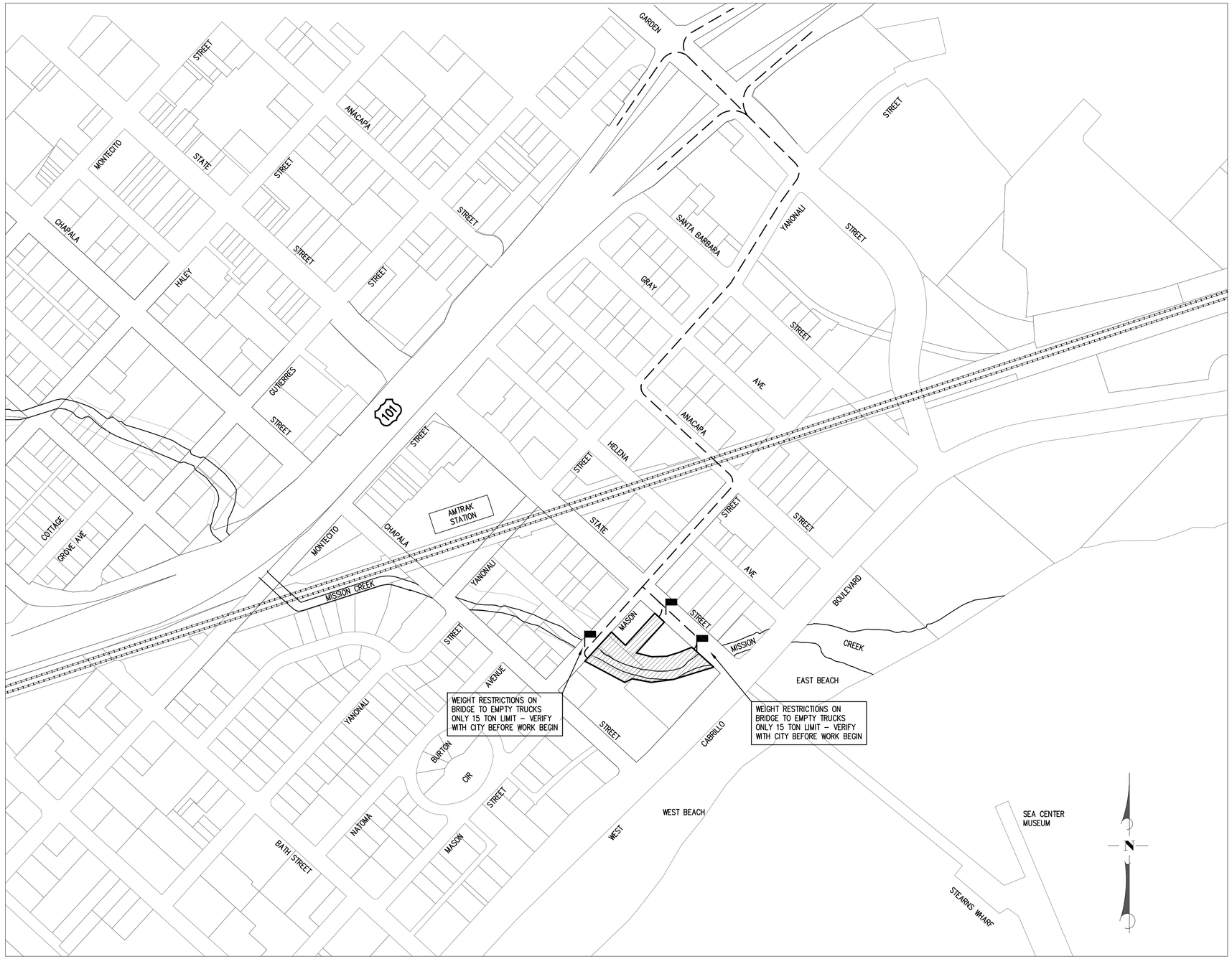
FILE NAME: 1910Q808-#21

DISTRICT FILE NO. 221/128
SPEC. NO.

SCALE AS SHOWN
SHEET 21 OF 22 SHEETS

B-7

11/3/2010 4:53:29 PM



LEGEND

WORK ZONE

VEHICLE DETOUR ROUTE

FLAGMAN

NOTES:

1. NUMBER OF TRUCKS: THERE WILL BE APPROXIMATELY 500 LOADS AT 20 TONS PER LOAD OVER A FOUR MONTHS PERIOD.
2. FLAGMAN AT ALL EXITS

LOWER MISSION CREEK – REACH 1A

TRUCK ROUTING PLAN

SCALE: 1"=200'

0 200 400 600

SYMBOL	DESCRIPTIONS	DATE	APPROVAL
0	FINAL SUBMITTAL	10/01/10	

REVISIONS

REACH 1A – LOWER MISSION CREEK

PHASE 2

TRUCK ROUTING PLAN

CITY OF SANTA BARBARA, CALIFORNIA

PREAPERD BY:

DEAN RYAN
CONSULTANTS & DESIGNERS, INC.
725 South Hill Street, Suite 3320
Los Angeles, California 90017
tel. 213.687.1130
fax. 213.687.1139

DESIGNED BY: RSW

DRAWN BY: VMM

CHECKED BY: MHB

U.S. ARMY ENGINEER DISTRICT LOS ANGELES
CORPS OF ENGINEERS

SUBMITTED BY:

COL. R.MARK TOY
CHIEF, DESIGN BRANCH

DISTRICT FILE NO.

SPEC. NO. 221/129

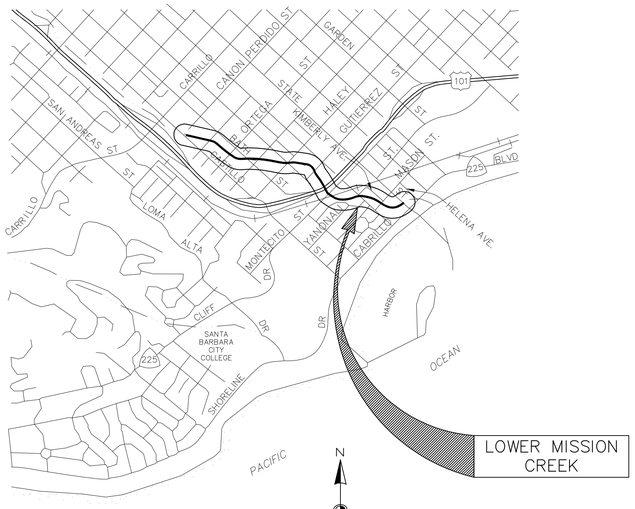
FILE NAME: 1910CT01-#22

SCALE AS SHOWN

SHEET 22 OF 22 SHEETS

T-1

11/3/2010 4:53:37 PM

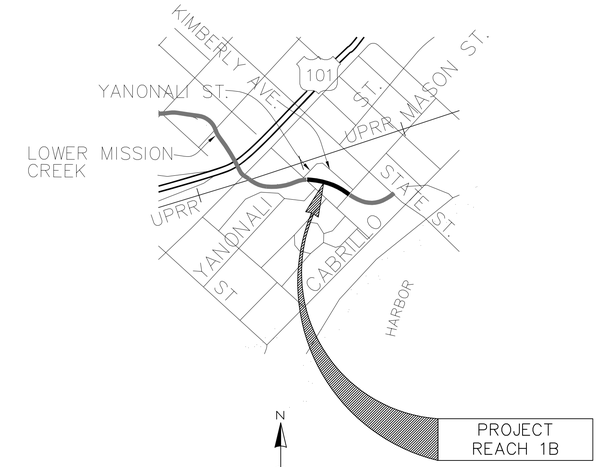


LOCATION MAP
N.T.S.

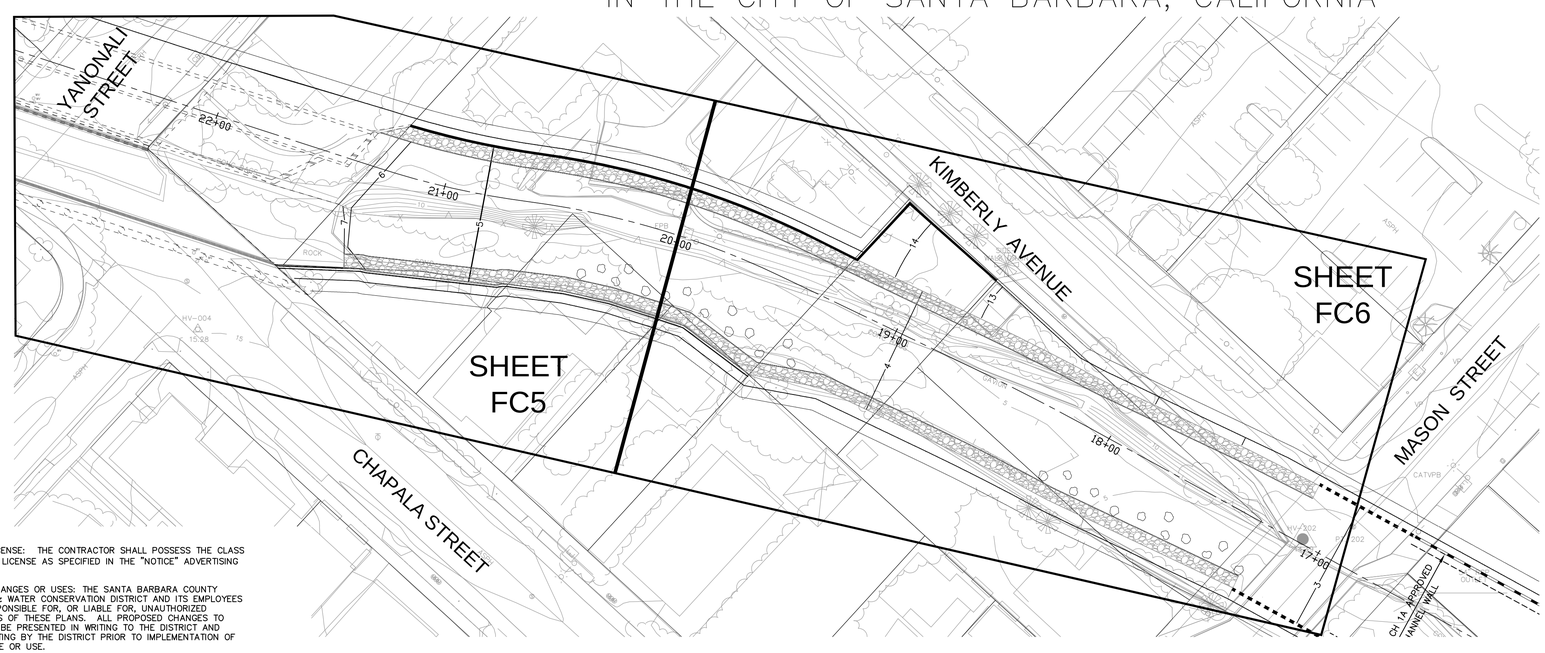
SANTA BARBARA COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT REACH 1B

MASON STREET TO YANONALI STREET
IN THE CITY OF SANTA BARBARA, CALIFORNIA



LOCATION MAP
N.T.S.



SHEET INDEX	SHEET NO.
TITLE	FC1
NOTES	FC2
NOTES, ABBREVIATIONS, & SYMBOLS	FC3
HORIZONTAL CONTROL	FC4
PLAN AND PROFILE (1)	FC5
PLAN AND PROFILE (2)	FC6
STORM DRAIN PLAN AND PROFILE	FC6A
STORM DRAIN LATERAL PLAN AND PROFILE	FC7
DETAILS (1)	FC8
DETAILS (2)	FC9
CROSS SECTIONS	FC10
DEMOLITION PLAN	FC11
PROPERTY DETAILS	FC12
STRUCTURAL WALL DETAILS	S1
BORING LOG	XXX

DISTRICT BOARD OF DIRECTORS

FIRST DISTRICT	SALUD CARBAJAL
SECOND DISTRICT	JANET WOLF
THIRD DISTRICT	DOREEN FARR
FOURTH DISTRICT	JONI GRAY
FIFTH DISTRICT	STEVE LAVAGNINO

CHAIR, BOARD OF DIRECTORS _____
DOREEN FARR

CITY ENGINEER _____
PAT KELLY

SCALE 1"=30'
30 0 30 60 120

CONTRACTOR'S LICENSE: THE CONTRACTOR SHALL POSSESS THE CLASS (OR CLASSES) OF LICENSE AS SPECIFIED IN THE "NOTICE" ADVERTISING FOR BIDS.

UNAUTHORIZED CHANGES OR USES: THE SANTA BARBARA COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT AND ITS EMPLOYEES WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES OR USES OF THESE PLANS. ALL PROPOSED CHANGES TO THE PLANS MUST BE PRESENTED IN WRITING TO THE DISTRICT AND APPROVED IN WRITING BY THE DISTRICT PRIOR TO IMPLEMENTATION OF ANY SUCH CHANGE OR USE.

REVISIONS

MARK	DESCRIPTION	DATE	APPR.

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTIRCT
123 E. ANAPAMU STREET
SANTA BARBARA, CA 93101
805.568.3440

TETRA TECH
800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B
TITLE SHEET

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME: T26034FC001.dwg
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC1
SHEET 1 OF X

P:\WATR\T29342 LOWER MISSION CRK 1B\05 DESIGN\T29342FC001.DWG 12/7/2012 10:16 AM

SURVEY NOTES

1. TOPOGRAPHIC MAPPING WAS COMPILED AT A SCALE OF 1"=200', WITH A 1 FOOT CONTOUR INTERVAL, USING STANDARD PHOTOGRAMMETRIC METHODS AND PROCEDURES BY ARROWHEAD MAPPING CORPORATION, FROM AERIAL PHOTOGRAPHY DATED MAY 5, 2003.
2. MAPPING IS SUPPLEMENTED BY DATA COLLECTED IN A FIELD SURVEY USING CONVENTIONAL METHODS AND PROCEDURES IN JUNE 2003 BY PENFIED & SMITH, AND IN AUGUST 2003 BY JOHNSON FRANK & ASSOCIATES.
3. THE AERIAL PHOTOGRAPHY USED AS THE BACKGROUND FOR THIS MAP WAS OBTAINED ON MAY 5, 2003 BY ARROWHEAD MAPPING CORPORATION, THE PHOTOGRAPHY HAS BEEN CONVERTED INTO A DIGITAL FORMAT AND CORRECTED FOR HORIZONTAL AND VERTICAL DISTORTION USING STANDARD PHOTOGRAMMETRIC METHODS.
4. BEARINGS SHOWN ON THIS MAP ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM, NAD 83, ZONE 5 GRID (EPOCH 1991.35), DEFINED LOCALLY BY THE SANTA BARBARA CONTROL NETWORK AS SHOWN ON RECORD OF SURVEY FILED WITH THE COUNTY SURVEYOR IN BOOK 147 PAGES 70–74. DISTANCES AND COORDINATES SHOWN AS MEASURED OR CALCULATED ARE EXPRESSED IN CCS, NAD 83, ZONE V GRID US SURVEY FOOT UNITS.
5. ELEVATIONS SHOWN HEREON ARE EXPRESSED IN U.S. SURVEY FEET AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), DEFINED LOCALLY BY THE SANTA BARBARA CONTROL NETWORK AS SHOWN ON RECORD OF SURVEY FILED WITH THE COUNTY SURVEYOR IN BOOK 147 PAGES 70–74.

GENERAL NOTES

1. EXISTING UTILITIES INFORMATION WAS ASSEMBLED FROM EXISTING UTILITY COMPANY MAPS.
2. REFERENCE DRAWINGS LISTED ON THE PLANS ARE AVAILABLE TO THE CONTRACTOR (SEE SPECIFICATIONS). THESE REFERENCE DOCUMENTS ARE NOT CONSIDERED EXHAUSTIVE AND COMPLETE, AND IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CONDUCT THOROUGH AND COMPLETE RESEARCH ON EXISTING CONDITIONS PRIOR TO COMMENCING WORK.
3. CONTRACTOR SHALL VERIFY SITE CONDITIONS AND LOCATION AND SIZE OF UNDERGROUND UTILITIES AS SHOWN ON THE DRAWINGS AND REPORT ANY DISCREPANCIES TO THE ENGINEER PRIOR TO COMMENCING WORK.
4. ALL FEES AND PERMITS SHALL BE PAID FOR BY THE CONTRACTOR.
5. THE CONTRACTOR SHALL NOTIFY, IN WRITING, ALL UTILITY COMPANIES AND GOVERNMENT AGENCIES PRIOR TO EXCAVATION WORK AND CALL DIG ALERT 811, PRIOR TO COMMENCING WORK.
6. FOR BORING LOGS AND OTHER GEOTECHNICAL INFORMATION, SEE PROJECT GEOTECHNICAL REPORTS BY BENGAL ENGINEERNING, INC. DATED AUGUST 2010. CONTRACTOR IS RESPONSIBLE TO OBTAIN ALL GEOTECHNICAL REPORT UPDATES.
7. CONTRACTOR IS ADVISED ADDITIONAL WORK BY OTHER CONTRACTORS WILL TAKE PLACE WITHIN AND ADJACENT TO THE PROJECT LIMITS. CONTRACTOR IS TO COORDINATE AND COOPERATE WITH OTHER CONTRACTORS AND GOVERNING AGENCIES AS REQUIRED.
8. SITE SECURITY DURING CONSTRUCTION SHOULD CONSIST OF TEMPORARY FENCING TO BE INSTALLED AND MAINTAINED BY THE CONTRACTOR DURING THE ENTIRE CONSTRUCTION OF THE PROJECT.

ENVIRONMENTAL CONTROL AND MAINTENANCE OF SITE CONDITIONS

1. THE CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL AS REQUIRED THROUGHOUT CONSTRUCTION AND INSPECT EROSION CONTROLS ON A MINIMUM WEEKLY BASIS.
2. PRIOR TO THE BEGINNING OF ANY CONSTRUCTION PHASE THE CONTRACTOR SHALL INSPECT ALL EROSION CONTROL AND MAKE ANY REPAIRS REQUIRED AS WELL AS CONFIRM THE INSTALLATION OF ANY ADDITIONAL EROSION CONTROL WHICH IS SPECIFIC TO ANY CONSTRUCTION PHASE.
3. THE CONTRACTOR'S STAGING AND STORAGE AREA SHALL CONFORM TO ALL EROSION CONTROL DETAILS AND SPECIFICATIONS. IF TEMPORARY DRAINAGE IS REQUIRED WITHIN THE STAGING AND STORAGE AREA IT SHALL CONFORM TO ALL EROSION CONTROL SPECIFICATIONS AND DETAILS AND APPROVED BY THE GOVERNING AGENCY PRIOR TO INSTALLATION.
4. ALL SOILS STORED WITHIN THE CONTRACTOR STAGING AND STORAGE AREA SHALL BE SURROUNDED BY A SINGLE ROW OF STAKED HAY BALES AND COVERED TO PREVENT WIND EROSION.
5. ALL TREE PROTECTION SHALL BE MAINTAINED AND INSPECTED THROUGHOUT CONSTRUCTION.
6. ALL DISTURBED AREAS SHALL BE LOAMED AND SEEDED AS SOON AS POSSIBLE. CONTRACTOR SHALL WATER AS REQUIRED BY CONTRACT DOCUMENTS TO ASSURE PROPER GROWTH.
7. PRECAUTIONS SHALL BE TAKEN TO PREVENT AND CONTROL DUST FROM CONSTRUCTION OPERATIONS BECOMING A NUISANCE TO ADJACENT AREAS. SURROUNDING STREETS AND WALKWAYS SHALL BE SWEPT AND WASHED CLEAN ON A DAILY BASIS OR AS DIRECTED BY GOVERNING AGENCY. STOCKPILES AND UNSTABILIZED SURFACES SHALL BE KEPT MOIST.
8. CONTRACTOR SHALL MAINTAIN VEHICULAR AND PEDESTRIAN TRAFFIC IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
9. UPON COMPLETION OF TRENCH BACKFILLING OR OTHER INDIVIDUAL ITEMS OF CONSTRUCTION, ALL SURPLUS MATERIALS AND EQUIPMENT NO LONGER NEEDED SHALL BE IMMEDIATELY REMOVED, LEAVING THE CONSTRUCTION SITE AND SURROUNDINGS FREE AND CLEAN.
10. AFTER WORK IS COMPLETE, SEWERS, DRAINS, MANHOLES, CATCH BASINS AND OTHER STRUCTURES SHALL BE CAREFULLY CLEANED OF DIRT, BROKEN MASONRY, MORTAR AND OTHER DEBRIS AND LEFT READY FOR USE.

CONSTRUCTION PHASING

PRIOR TO THE START OF CONSTRUCTION THE CONTRACTOR SHALL:

1. SUBMIT PLAN OF PROPOSED CONTRACTOR STAGING AND STORAGE AREA FOR REVIEW AND APPROVAL BY GOVERNING AGENCY.
2. SUBMIT FOR APPROVAL A TRAFFIC PLAN SHOWING HOW ALL TRUCK MOVEMENTS TO AND FROM THE SITE ARE TO BE ACCOMPLISHED.
3. REVIEW ALL EXISTING UTILITY INFORMATION PROVIDED IN THE CONTRACT DOCUMENTS AND CONDUCT ALL OTHER ADDITIONAL RESEARCH REQUIRED TO CONFIRM EXISTING UTILITIES. ANY DISCREPANCIES SHALL BE IMMEDIATELY REPORTED.
4. MARK OUT ALL EXISTING UTILITIES ON THE SITE AND COORDINATE WITH EACH UTILITY OWNER OR OPERATOR ON THE WORK THAT WILL AFFECT EACH UTILITY. THE GOVERNING AGENCY SHALL BE NOTIFIED THAT THE UTILITY OWNERS/OPERATORS HAVE BEEN CONTACTED AND SHALL BE PRESENTED FOR ALL SITE MEETINGS.
5. SUBMIT TO THE GOVERNING AGENCY COMPLETE PHASING PLANS FOR REVIEW AND APPROVAL.

SITE PREPARATION AND DEMOLITION

1. CONTRACTOR SHALL DISPOSE OF ALL DEMOLISHED MATERIAL AND DEBRIS IN ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS HAVING JURISDICTION.
2. CONTRACTOR SHALL RESTORE TO THEIR ORIGINAL CONDITION ANY AREAS ADJACENT TO AND OUTSIDE THE LIMIT OF WORK WHICH ARE DISTURBED DURING CONSTRUCTION, AT THE CONTRACTOR'S OWN EXPENSE.
3. CONTRACTOR SHALL SAW CUT PAVEMENT WHERE PAVEMENT TO BE REMOVED ABUTS PAVEMENT WHICH IS TO REMAIN.
4. CONTRACTOR SHALL STOCKPILE ALL STRIPPED TOPSOIL OFFSITE.
5. UTILITY SERVICES SHALL BE MAINTAINED TO ALL BUILDINGS BEING OCCUPIED AT ALL TIMES.
6. CONTRACTOR SHALL PROVIDE ADEQUATE DRAINAGE AT ALL TIMES WITHIN THE LIMIT OF WORK. THERE SHALL BE NO PONDING OF WATER OR EROSION OF LANDSCAPED AREAS AT ANY TIME.
7. EXISTING UTILITIES, INDICATED TO REMAIN, SHALL BE PROTECTED IN PLACE, AND MAINTAINED IN GOOD WORKING CONDITION.

LAYOUT

1. LABELED DIMENSIONS SUPERSEDE SCALED DIMENSIONS FOR ALL LAYOUT WORK.
2. AT ALL LOCATIONS, STATION AND OFFSETS ARE GIVEN TO REVEAL SIDE OF CURB OR EDGE OF PAVEMENT AS APPROPRIATE.
3. ALL LINES ARE PARALLEL OR PERPENDICULAR UNLESS OTHERWISE INDICATED.
4. ALL HORIZONTAL DRAWING DIMENSIONS SHALL BE MEASURED IN A TRUE VERTICAL PLANE, EXCEPT AS OTHERWISE NOTED.

GRADING

1. THE CONTRACTOR SHALL PROVIDE UNIFORM SLOPE BETWEEN SPOT GRADES AND CONTOURS.
2. THE CONTRACTOR SHALL ADJUST ALL EXISTING UTILITY CASTINGS TO LINE AND GRADE, UNLESS OTHERWISED NOTED.

UTILITY

1. CONTRACTOR SHALL VERIFY LOCATIONS, ELEVATIONS AND SIZES OF ALL EXISTING UTILITIES PRIOR TO ANY CONSTRUCTION. CALL DIG ALERT AT 811, A MINIMUM OF TWO (2) FULL WORKING DAYS PRIOR TO EXCAVATING.
2. CONTRACTOR SHALL FIELD VERIFY EXISTING SEWER AND STORM DRAIN ELEVATIONS WHICH MAY REQUIRE POT–HOLING.
3. CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS.
4. CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE ALL UTILITY WORK WITH THE APPROPRIATE GOVERNING AGENCIES.

STRUCTURAL NOTES

1. REINFORCED CONCRETE MEMBERS ARE DESIGNED IN ACCORDANCE WITH "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE", AMERICAN CONCRETE INSTITUTE, (ACI 318M) STRENGTH DESIGN METHOD.
2. STRUCTURAL STEEL MEMBERS ARE DESIGNED IN ACCORDANCE WITH "MANUAL OF STEEL CONSTRUCTION, ALLOWABLE STRESS DESIGN", AMERICAN INSTITUTE OF STEEL CONSTRUCTION.
3. DESIGN LOADS: DEAD LOADS/MATERIAL DENSITIES

NORMAL WEIGHT CONCRETE	150 PCF
STRUCTURAL STEEL	490 PCF
BACKFILLED SOIL	120 PCF
WATER AND BUOYANCY	62.4 PCF
ALUMINUM	170 PCF
VEHICULAR LIVE LOADS:	AASHTO HS–20 VEHICLE AASHTO HS–25 VEHICLE

4. FOR GEOTECHNICAL DATA, SEE PROJECT GEOTECHNICAL REPORTS FROM BENGAL ENGINEERNING, INC. DATED AUGUST 2010.
5. ALL DIMENSIONS TO REINFORCING SHOWN ON THE DRAWINGS ARE TO CENTERLINES OF BARS UNLESS OTHERWISE NOTED.

FOUNDATIONS:

1. ALL UNSUITABLE MATERIAL SHALL BE REMOVED AND REPLACED AS DIRECTED BY THE ENGINEER PRIOR TO ANY CONSTRUCTION OR BACKFILL.
2. BACKFILL SHALL BE PLACED AND COMPACTED ON SIDES OF STRUCTURES SIMULTANEOUSLY IN ACCORDANCE WITH THE SPECIFICATIONS.
2. TOP OF ROCK ELEVATION IS DEFINED BY THE GEOTECHNICAL DATA REPORT AT DISCRETE BORING LOCATIONS ONLY.

CONCRETE

1. STRUCTURAL CONCRETE, INCLUDING ALL PRECAST COMPONENTS, SHALL ATTAIN A 28 DAY COMPRESSIVE STRENGTH OF 4000 PSI AND SHALL CONFORM TO THE REQUIREMENTS OF THE PROJECT SPECIFICATION
2. PROVIDE A 3/4" CHAMFER AT ALL EXPOSED CONCRETE EDGES UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
3. CONCRETE WORK SHALL BE COORDINATED AND VERIFIED WITH ALL OTHER WORK TO ENSURE PROPER PROVISIONS FOR DOWELS, INSERTS, EMBEDMENTS, PIPING AND MANHOLE REQUIREMENTS PRIOR TO CONCRETE PLACEMENT.
4. CONSTRUCTION JOINTS SHOWN ON THE DRAWINGS SHALL NOT BE OMITTED WITHOUT PRIOR APPROVAL.
5. CONSTRUCTION JOINTS, IN ADDITION TO THOSE SHOWN ON THE DRAWINGS, SHALL NOT BE PERMITTED UNLESS ACCEPTED IN WRITING BY THE GOVERNING AGENCY.

REINFORCEMENT

1. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615, GRADE 60 UNLESS OTHERWISE NOTED.
2. WELDED BARS SHALL CONFORM TO THE REQUIREMENTS OF ASTM, A706, GRADE 60.
3. EPOXY–COATED REINFORCEMENT SHALL CONFORM TO THE REQUIREMENTS OF ASTM A775.
4. THE MINIMUM CONCRETE COVER FOR REINFORCING STEEL SHALL BE 2", EXCEPT IT SHALL BE 3" FOR CONCRETE CAST DIRECTLY AGAINST EARTH.
5. SEE STRUCTURAL SPECIFICATIONS FOR SPECIFIC REINFORCEMENT GUIDELINES
6. BARS SHALL BE MECHANICALLY SPLICED WHERE INDICATED ON THE DRAWINGS AND AS OTHERWISE REQUIRED TO ACCOMMODATE CONSTRUCTION SEQUENCING. MECHANICAL SPLICES SHALL DEVELOP 125% OF THE YIELD STRENGTH OF THE BAR.
7. MECHANICAL SPLICES SHALL BE STAGGERED A MINIMUM OF 12" ADJACENT BARS.

UNAUTHORIZED CHANGES OR USES: THE SANTA BARBARA COUNTY FLOOD CONTROL & WATER CONSERVATION DISTRICT AND ITS EMPLOYEES WILL NOT BE RESPONSIBLE FOR, OR LIABLE FOR, UNAUTHORIZED CHANGES OR USES OF THESE PLANS. ALL PROPOSED CHANGES TO THE PLANS MUST BE PRESENTED IN WRITING TO THE DISTRICT AND APPROVED IN WRITING BY THE DISTRICT PRIOR TO IMPLEMENTATION OF ANY SUCH CHANGE OR USE.

REVISIONS

MARK	DESCRIPTION	DATE	APPR.

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTIRCT
123 E. ANAPAMU STREET
SANTA BARBARA, CA 93101
805.568.3440

TETRA TECH
800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B
NOTES

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME:
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC2
SHEET 2 OF X

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STRUCTURAL STEEL

1. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH THE LATEST EDITIONS OF THE AISC SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STREEL FOR BUILDINGS AND THE CODE OF STANDARD PRACTICE FOR BUILDING.
2. ALL STRUCTURAL STEEL SHAPES, PLATES AND BARS SHALL CONFORM TO ASTM 436, YIELD STRENGTH 36 KSI, UNLESS OTHERWISE NOTED. ALL TUBES SHALL CONFORM TO ASTM A500 COLD FORMED, ASTM A501 HOT FORMED, YIELD STRENGTH 50 KSI.
3. ALL WELDING SHALL CONFORM TO ANSI/AWS D1.1–90 "STRUCTURAL WELDING CODE".
4. ALL WELDING SHALL BE DONE BY APPROVED CERTIFIED WELDERS WITH E70XX ELECTRODES. WELDS SHALL DEVELOP THE FULL STRENGTH OF THE MATERIALS BEING CONNECTED UNLESS NOTED OTHERWISE. FILLET WELDS SHALL BE A MINIMUM OF 5mm.
5. ALL BOLTS AND RELATED HARDWARE SHALL CONFORM TO THE REQUIREMENTS OF ASTM A325 AND SHALL BE IN STANDARD HOLES UNLESS OTHERWISE NOTED.
6. ALL STEEL TO BE INSTALLED IN THE UTILITY CHASE, SHALL BE PREPARED AND FINISHED IN ACCORDANCE WITH SPECIFICATION 05501.
7. ALL ANCHOR BOLTS AND RELATED HARDWARE SHALL BE ASTM F1554, YIELD STRENGTH 55 KSI, UNLESS OTHERWISE NOTED.
8. ALL BOLTS, NUTS AND WASHERS SHALL BE HOT–DIPPED GALVANIZED.

CONSTRUCTION NOTES

- 1 REMOVE EXISTING BUILDING STRUCTURE
- 2 REMOVE EXISTING UTILITY STRUCTURE
- 3 REMOVE EXISTING CHANNEL STRUCTURE
- 4 REMOVE EXISTING MISC. CONCRETE
- 5 REMOVE EXISTING AC PAVEMENT
- 6 REMOVE INTERFERING PORTIONS OF EXISTING STORM DRAIN
- 7 CONSTRUCT CHANNEL PER DETAIL X ON SHEET X. CHANNEL WIDTH VARIES PER PLAN
- 8 PLACE RIPRAP TOE REVETMENT PER DETAIL B ON SHEET FC8
- 9 EXISTING OVERHEAD WIRE (PIP)
- 10 CONSTRUCT LOW FLOW PIPES WITH FLAP VALVE PER DETAIL ON SHEET FC7
- 11 PLACE BOULDER CLUSTERS PER DETAIL F ON SHEET FC8
- 12 NOT USED
- 13 CONSTRUCT MANHOLE STRUCTURE PER APWA STD PLAN NO. 320.
- 14 CONSTRUCT TYPE 1 CHANNEL WALL (SOLDIER) PER DETAIL X ON SHEET X
- 15 CONSTRUCT CONCRETE CUTOFF WALL PER CALTRANS STD PLAN NO. 84D
- 16 CONSTRUCT EXPANDED HABITAT ZONE PER SHEET FC13
- 17 CONSTRUCT TYPE 4 CHANNEL WALL (DIVIDER) PER DETAIL X ON SHEET X
- 18 CONSTRUCT DRAINAGE DITCH PER DETAIL G ON SHEET FC8
- 19 CONSTRUCT DROP INLET STRUCTURE DETAIL ON SHEET FC9
- 20 REMOVE EX PZC18 X 9' STEEL SHEET PILE SHORING AND PLYWOOD BULKHEAD AFTER COMPLETION OF PROJECT
- 23 CONSTRUCT SAFETY FENCE/RAILING PER APWA STANDARD PLAN 606.
- 24 RELOCATE EXISTING UTILITY
- 26 PLACE COMPACTED FILL

LINETYPES

OHW	OVERHEAD WIRE
AS	UNDERGROUND ABANDONED SEWER
AW	UNDERGROUND ABANDONED WATER
G	UNDERGROUND GAS
E	UNDERGROUND ELECTRIC
FOC	UNDERGROUND FIBER OPTIC CABLE
RW	UNDERGROUND RECLAIMED WATER
S	UNDERGROUND SEWER
SD	UNDERGROUND STORM DRAIN
SL	UNDERGROUND STREET LIGHT (ELEC.)
T	UNDERGROUND TELEPHONE
TR	UNDERGROUND TRAFFIC SIGNAL (ELEC.)
W	UNDERGROUND WATER
	EXISTING
	ABANDONED IN PLACE
	CONTOUR GRADE LINE
	RIP–RAP
	PROPOSED CONCRETE
	SOIL
	RIGHT–OF–WAY (R/W)
	CENTER LINE/CONTROL LINE
TCE	TEMPORARY CONSTRUCTION EASEMENT (TCE)
	LIMITS OF CONSTRUCTION

ABBREVIATIONS

ABAND.	ABANDONED
ABC	AGGREGATE BASE COURSE
AC	ASPHALTIC CONCRETE
APPROX.	APPROXIMATE
AVE	AVENUE
BC	BEGIN CURVE
BLDG	BUILDING
℄	CENTERLINE
C	CURVE DATA
CF	CUBIC FEET
CFS	CUBIC FEET PER SECOND
CH	CHANNEL
C.J.	CONSTRUCTION JOINT
CLR	CLEAR
CMP	CORRUGATED METAL PIPE
COE	CORPS OF ENGINEERS
CONC	CONCRETE
CONST.	CONSTRUCT
CY	CUBIC YARD
DIA	DIAMETER
DR	DRIVE
E	EAST, EASTING
EA	EACH
EC	END CURVE
EG	EXISTING GRADE
EL	ELEVATION
EX	EXISTING
EOP	EDGE OF PAVEMENT
FG	FINISH GRADE
FL	FLOWLINE
FS	FINISH SURFACE
FT	FEET
FWY	FREEWAY
GALV	GALVANIZED
GB	GRADE BREAK
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HOR	HORIZONTAL
HT	HEIGHT
INV	INVERT ELEVATION
L	LINE DATA
LBS	POUNDS
LF	LINEAR FEET
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MWD	METROPOLITAN WATER DISTRICT
N	NORTH, NORTHING
NAD	NORTH AMERICAN DATUM
NAVD	NORTH AMERICAN VERTICAL DATUM
NTS	NOT TO SCALE
OC	ON CENTER
OG	ORIGINAL GROUND
PED	PEDESTRIAN
PERF.	PERFORATED
PCC	POINT OF COMPUND CURVE
PI	POINT OF INTERSECTION
PIP	PROTECT IN PLACE
PRC	POINT OF REVERSE CURVE
PROP	PROPOSED
PVC	POLYVINYL CHLORIDE
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RD	ROAD
RET	RETAINING
ROW	RIGHT–OF–WAY
S=	SLOPE
S	SOUTH
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SF	SQUARE FEET
SHT	SHEET
SS	SANITARY SEWER
STA	STATION
STD	STANDARD
STR	STRUCTURE
TBD	TO BE DETERMINED
TF	TOP OF FOOTING
TOB	TOP OF BANK
TOW	TOP OF WALL
TYP	TYPICAL
UG	UNDERGROUND
VERT	VERTICAL
VLF	VERTICAL LINEAR FEET
W	WEST
WS	WATER SURFACE

STANDARD PLANS AND DETAILS

AMERICAN PUBLIC WORKS ASSOCIATION (APWA)

MANHOLE STRUCTURE PIPE TO PIPE MAIN LINE– STD PLAN NO. 320

SAFTY FENCE/ RAILING– STD PLAN NO. 606

CALTRANS

CONCRETE CUTOFF WALL– STD PLAN NO. 84D

SYMBOLS

- CATCH BASIN
- FIRE HYDRANT
- ICV — IRRIGATION CONTROL
- VALVE METER
- MANHOLE (TYPE INDICATED)
- OBSERVATION MONITORING WELL
- POWER POLE
- PULLBOX (TYPE INDICATED)
- STREET LIGHT
- WATER VALVE
- WATER SURFACE
- SLOPE
- 24 — EXISTING ELEVATION

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REVISIONS

MARK	DESCRIPTION	DATE	APPR.

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTIRCT
123 E. ANAPAMU STREET
SANTA BARBARA, CA 93101
805.568.3440

TETRA TECH
800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B

NOTES, ABBREV., SYMBOLS & CONSTRUCTION NOTES

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME:
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC3
SHEET 3 OF X

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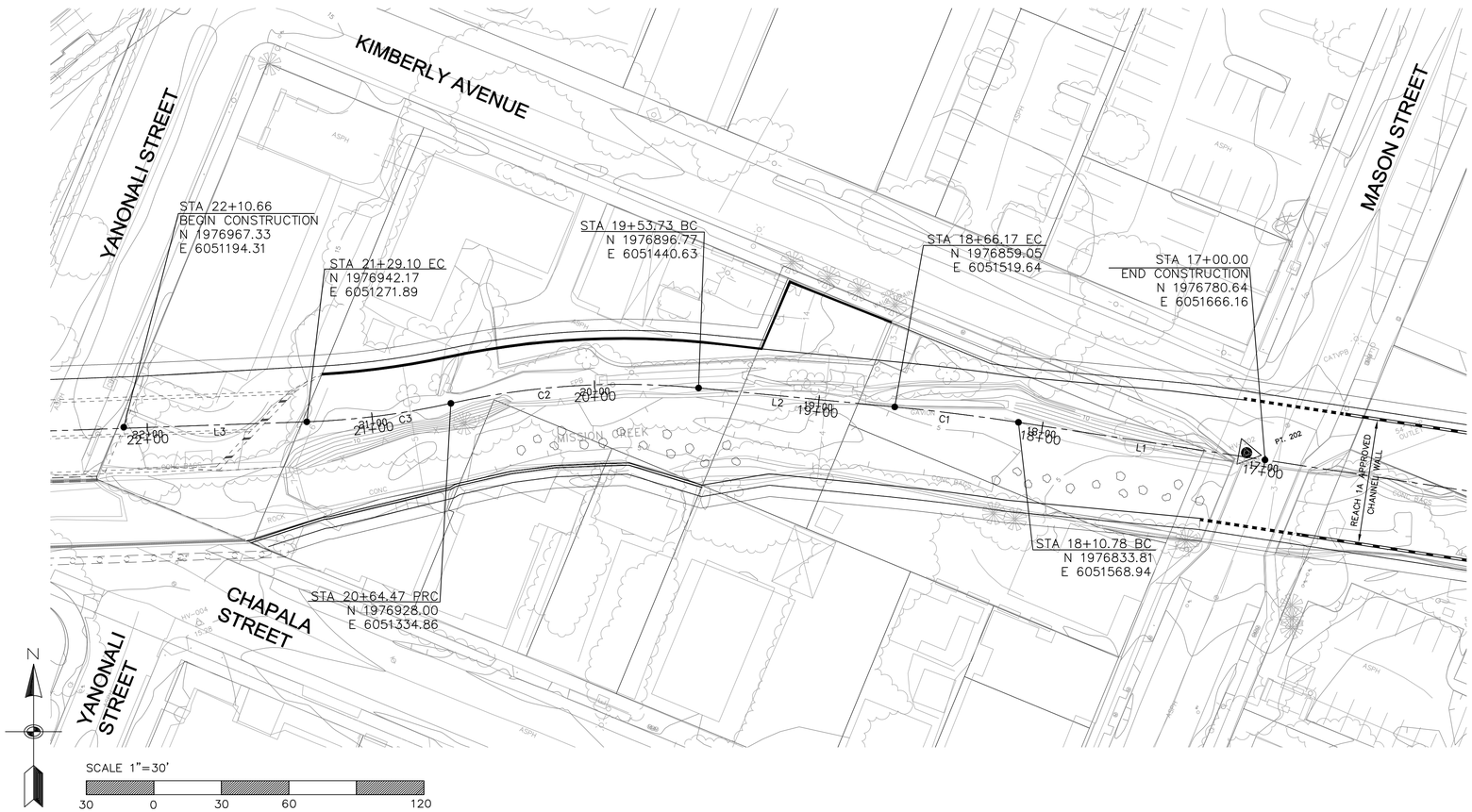
LOWER MISSION CREEK REACH 1B – LINE TABLE								
LINE NO.	BEG. NORTHING	BEG. EASTING	BEG. STATION	END STATION	END NORTHING	END EASTING	LENGTH	BEARING
L1	1976716.82	6051782.71	15+67.09	18+10.78	1976833.81	6051568.94	243.69'	N61°18'29.09"W
L2	1976859.05	6051519.64	18+66.17	19+53.73	1976896.77	6051440.63	87.56'	N64°28'54.79"W
L3	1976942.17	6051271.89	21+29.10	23+21.54	1977001.54	6051088.84	192.44'	N72°01'49.56"W

LOWER MISSION CREEK REACH 1B – CURVE TABLE										
CURVE NO.	BEG. STATION	BEG. NORTHING	BEG. EASTING	END STATION	END NORTHING	END EASTING	LENGTH	RADIUS	DELTA	TANGENT
C1	18+10.78	1976833.81	6051568.94	18+66.17	1976859.05	6051519.64	55.39'	1000.00'	3°10'25.70"	27.70'
C2	19+53.73	1976896.77	6051440.63	20+64.47	1976928.00	6051334.86	110.74'	350.00'	18°07'43.95"	55.84'
C3	20+64.47	1976928.00	6051334.86	21+29.10	1976942.17	6051271.89	64.63'	350.00'	10°34'49.44"	32.41'



BENCHMARK

FOUND STANDARD USC&GS BRASS TIDAL STATION DISK (DESIGNATION 941 1340 TIDAL 1) STAMPED "BM 1 1930" NEAR THE INTERSECTION OF HELENA AVENUE AND EAST CABRILLO BLVD., SET IN THE TOP OF THE NE'LY END OF A 4' HIGH CONCRETE GUARDRAIL OF THE BRIDGE OVER MISSION CREEK, 52.5' SE'LY OF THE CENTERLINE OF CABRILLO BLVD.
ELEVATION = 4.921 METERS NAVD88.

SURVEY CONTROL

1. TOPOGRAPHIC MAPPING WAS COMPILED AT A SCALE OF 1"=200', WITH A 1 FOOT CONTOUR INTERVAL, USING STANDARD PHOTOGRAMMETRIC METHODS AND PROCEDURES BY ARROWHEAD MAPPING CORPORATION, FROM AERIAL PHOTOGRAPHY DATED MAY 5, 2003.

2. MAPPING IS SUPPLEMENTED BY DATA COLLECTED IN A FIELD SURVEY USING CONVENTIONAL METHODS AND PROCEDURES IN JUNE 2003 BY PENFIED & SMITH, AND IN AUGUST 2003 BY JOHNSON FRANK & ASSOCIATES.

3. BEARINGS SHOWN ON THIS MAP ARE BASED ON THE CALIFORNIA COORDINATE SYSTEM, NAD 83, ZONE 5 GRID (EPOCH 1991.35), DEFINED LOCALLY BY THE SANTA BARBARA CONTROL NETWORK AS SHOWN ON RECORD OF SURVEY FILED WITH THE COUNTY SURVEYOR IN BOOK 147 PAGES 70–74. DISTANCES AND COORDINATES SHOWN AS MEASURED OR CALCULATED ARE EXPRESSED IN CCS, NAD 83, ZONE V GRID US SURVEY FOOT UNITS.

4. ELEVATIONS SHOWN HEREON ARE EXPRESSED IN U.S. SURVEY FEET AND ARE REFERENCED TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88), DEFINED LOCALLY BY THE SANTA BARBARA CONTROL NETWORK AS SHOWN ON RECORD OF SURVEY FILED WITH THE COUNTY SURVEYOR IN BOOK 147 PAGES 70–74.

5. THE EXISTING UTILITIES SHOWN HEREON HAVE BEEN COMPILED FROM ATLAS MAPS OBTAINED FROM THE FOLLOWING PUBLIC AND PRIVATE ENTITIES:

   ELECTRIC – SOUTHERN CALIFORNIA EDISON COMPANY
   GAS – SOUTHERN CALIFORNIA GAS COMPANY
   CATV – COX COMMUNICATIONS
   TELEPHONE COMMUNICATIONS – VERIZON
   FIBER OPTIC CABLE – AT&T
   FIBER OPTIC CABLE – U.S. SPRINT
   FIBER OPTIC CABLE – MCI NETWORK SERVICES INC.
   WATER – CITY OF SANTA BARBARA
   SEWER – CITY OF SANTA BARBARA
   STORM DRAIN – CITY OF SANTA BARBARA

6. COMPILED UTILITIES HAVE BEEN GEOREFERENCED TO VISIBLE SURFACE UTILITIES LOCATED BY SAID AERIAL MAPPING AND SUPLEMENTAL FIELD SURVEYS.

7. TETRA TECH INC. DOES NOT ACCEPT ANY RESPONSIBILITY FOR INDICATED SIZES, LOCATIONS, ACCURACY OR COMPLETENESS OF INFORMATION OBTAINED FROM SAID ATLAS MAPS.

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MARK	DESCRIPTION	DATE	APPR.

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTIRCT
123 E. ANAPAMU STREET
SANTA BARBARA, CA 93101
805.568.3440

TETRA TECH
800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B
HORIZONTAL CONTROL

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME:
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC4
SHEET 4 OF X

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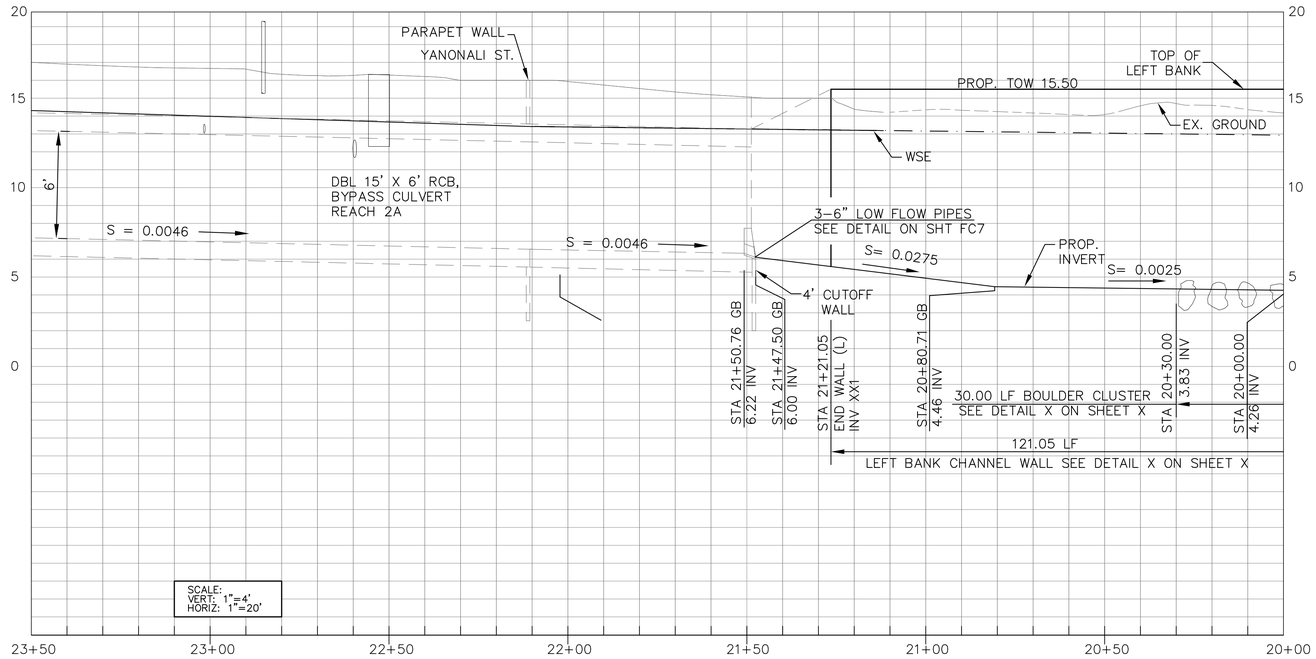
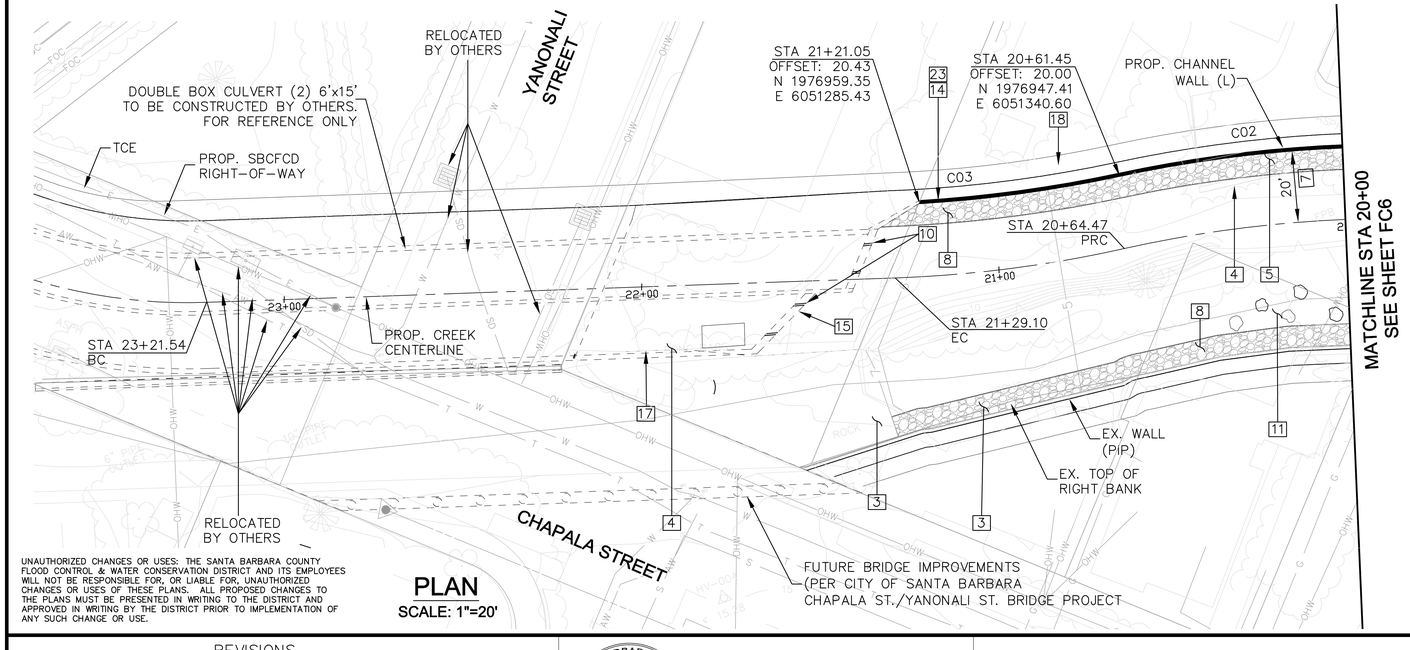


CONSTRUCTION NOTES

1. EXISTING BUILDING STRUCTURE TO BE REMOVED
3. EXISTING CHANNEL STRUCTURE TO BE REMOVED
4. EXISTING MISC. CONCRETE TO BE REMOVED
5. EXISTING AC PAVEMENT TO BE REMOVED
7. CONSTRUCT CHANNEL PER DETAIL X ON SHEET X. CHANNEL WIDTH VARIES PER PLAN
8. PLACE RIPRAP TOE REVETMENT PER DETAIL B ON SHEET FC8
10. CONSTRUCT LOW FLOW PIPES WITH FLAP VALVE PER DETAIL ON SHEET FC7
11. PLACE BOULDER CLUSTERS PER DETAIL F ON SHEET FC8
14. CONSTRUCT TYPE 1 CHANNEL WALL (SOLDIER) PER DETAIL X ON SHEET X
15. CONSTRUCT CONCRETE CUTOFF PER CALTRANS STD PLAN NO. 84D
17. CONSTRUCT TYPE 4 CHANNEL WALL (DIVIDER) PER DETAIL X ON SHEET X
18. CONSTRUCT DRAINAGE DITCH PER DETAIL G ON SHEET FC8
23. CONSTRUCT SAFETY FENCE/RAILING PER APWA STANDARD PLAN 606.



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PLAN
SCALE: 1"=20'

N

SCALE 1"=20'

20 0 20 40 60

INSIDE CHANNEL WALL CURVE TABLE

CURVE	LENGTH	TAN	DELTA	RADIUS
C02	113.88'	57.39'	17°38'04"	370.00'
C03	66.32'	33.25'	10°09'38"	374.00'

REVISIONS

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TETRA TECH
800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B
PLAN AND PROFILE (1)
(STA 22+18.74 TO 20+00.00)

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME:
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC5
SHEET ___ OF X

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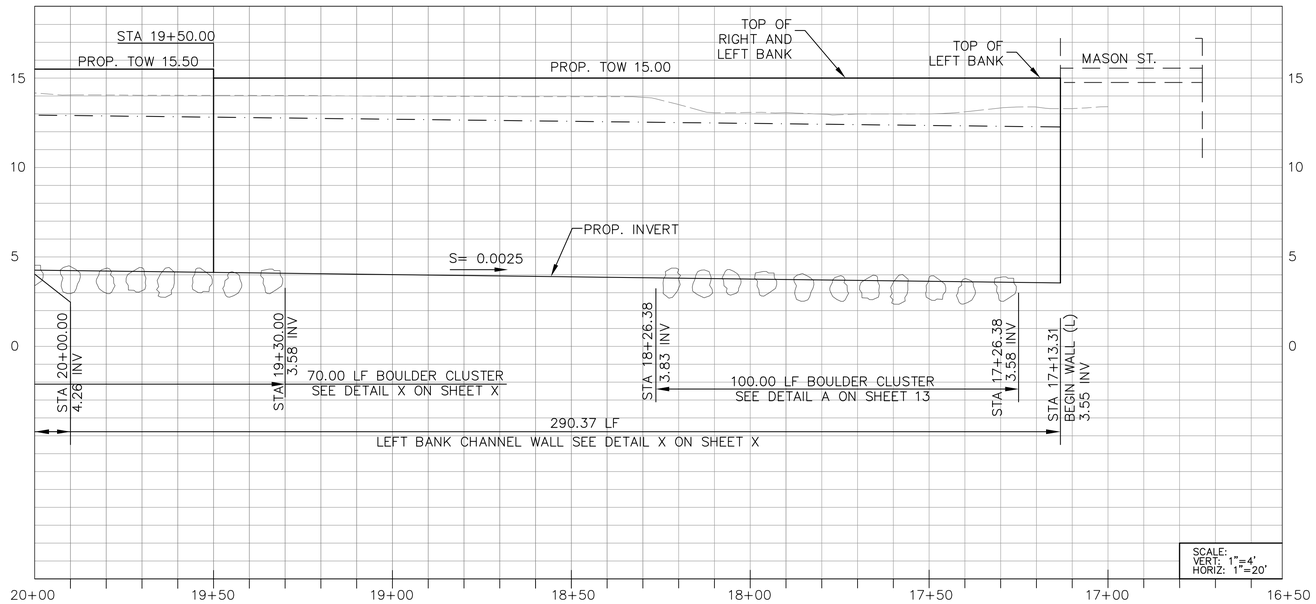


CONSTRUCTION NOTES

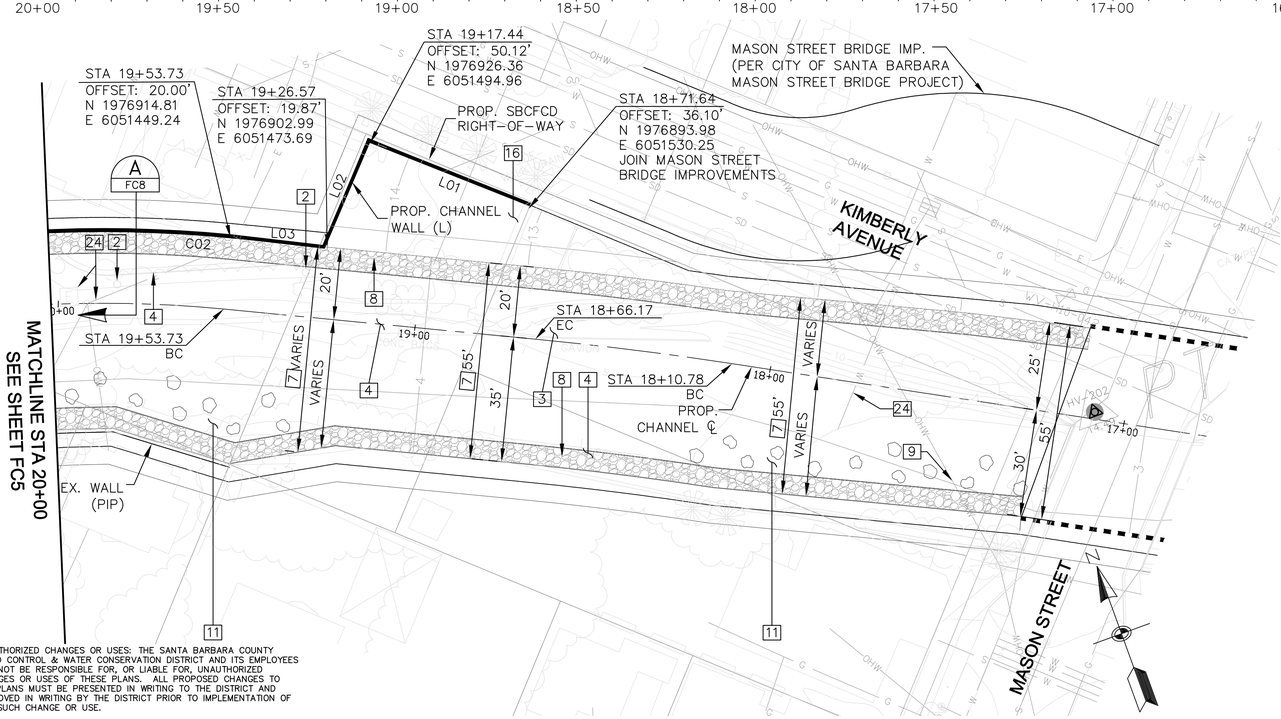
- 2 EXISTING UTILITY STRUCTURE TO BE REMOVED
- 3 EXISTING CHANNEL STRUCTURE TO BE REMOVED
- 4 EXISTING MISC. CONCRETE TO BE REMOVED
- 7 CONSTRUCT CHANNEL PER DETAIL X ON SHEET X. CHANNEL WIDTH VARIES PER PLAN
- 8 PLACE RIPRAP TOE REVETMENT PER DETAIL B ON SHEET FC8
- 9 EXISTING OVERHEAD WIRE (PIP)
- 11 PLACE BOULDER CLUSTERS PER DETAIL F ON SHEET FC8
- 14 CONSTRUCT TYPE 1 CHANNEL WALL (SOLDIER) PER DETAIL X ON SHEET X
- 16 CONSTRUCT EXPANDED HABITAT ZONE PER SHEET FC13
- 24 RELOCATE EXISTING UTILITY

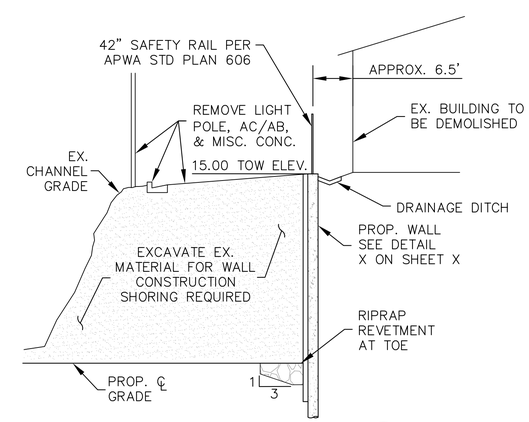
INSIDE CHANNEL WALL LINE TABLE

LINE	BEARING	LENGTH
L01	S47°34'11"E	49.03'
L02	N42°14'03"E	32.77'
L03	S64°28'55"E	26.14'

INSIDE CHANNEL WALL CURVE TABLE

CURVE	LENGTH	TAN	DELTA	RADIUS
C02	113.88'	57.39'	17°38'04"	370.00'





STA. 19+86.49 SECTION (A / FC8)

NOT TO SCALE

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SANTA BARBARA, CA 93101
805.568.3440

TETRA TECH
800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800
ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B

PLAN AND PROFILE
(STA. 20+00.00 TO 17+13.31)

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME:
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC6
SHEET ___ OF X

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805.568.3440

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800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B

PLAN AND PROFILE
STORM DRAIN LATERAL A

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME:
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC7
SHEET ___ OF X

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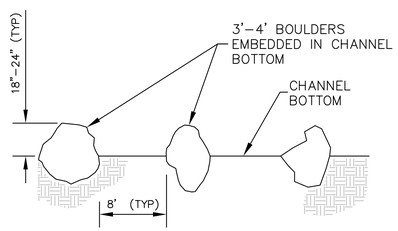
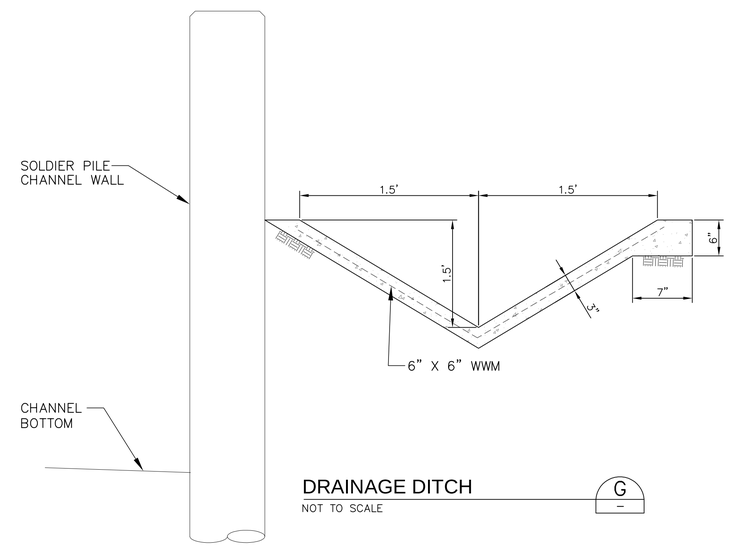
RIPRAP GRADATION

D100 (MAX) [IN]	LIMITS OF STONE WEIGHT [LB] FOR PERCENT LIGHTER BY WEIGHT						D30 (MIN) [IN]	D90 (MIN) [IN]
	100%		50%		15%			
18	265	106	78	53	39	17	9	13



BOULDER CLUSTER DETAIL F
NOT TO SCALE



DRAINAGE DITCH G
NOT TO SCALE

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TETRA TECH
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LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

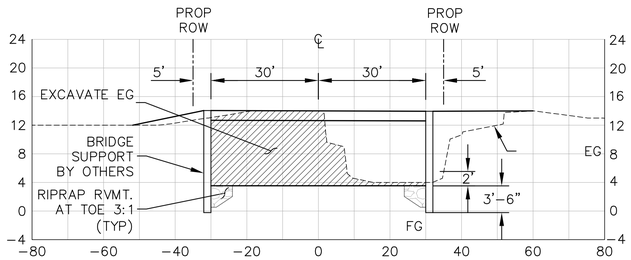
SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B
DETAILS (1)

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME: T29342FC008.dwg
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC8
SHEET 8 OF X

P:\WATR\T29342 LOWER MISSION CRK 1B\05 DESIGN\T29342FC008.DWG 12/7/2012 9:19 AM



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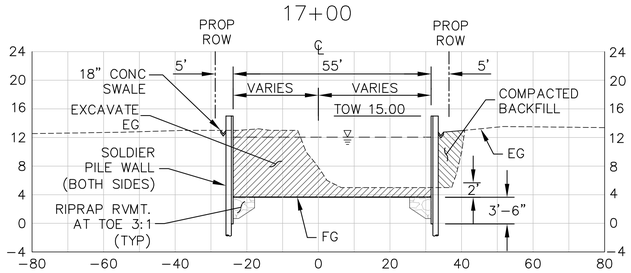

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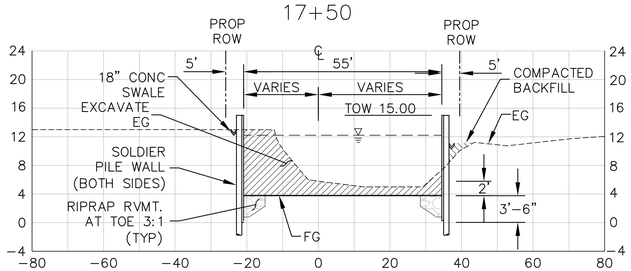

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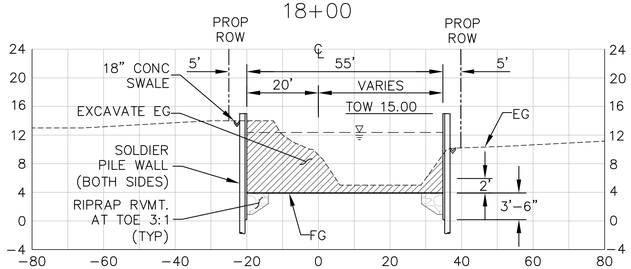

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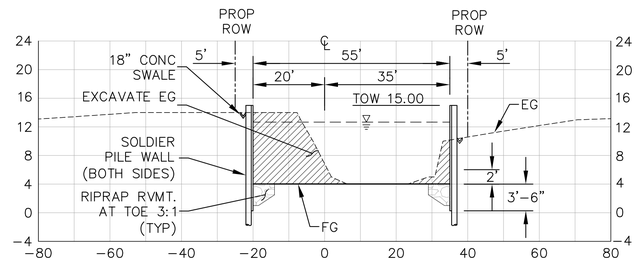

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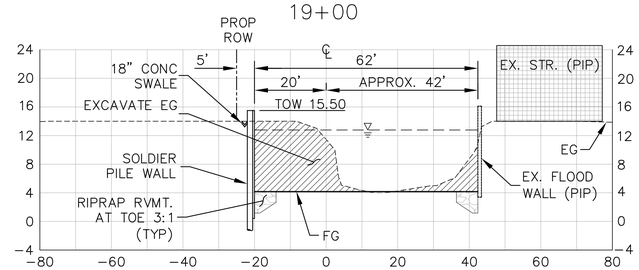

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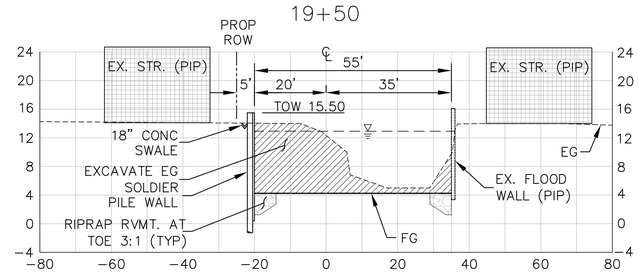

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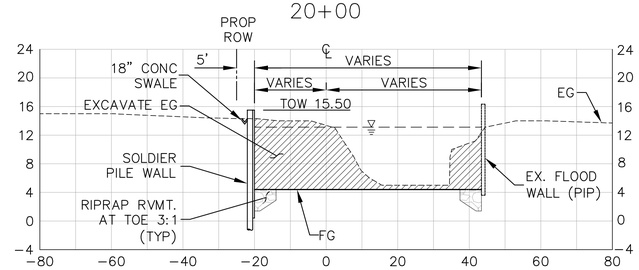

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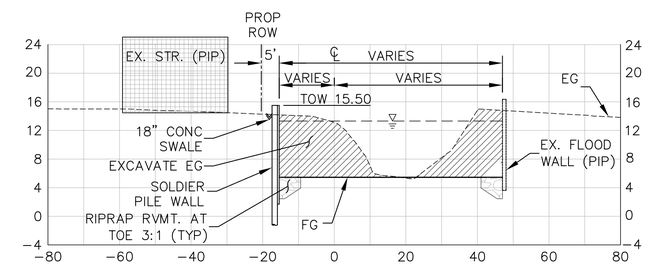

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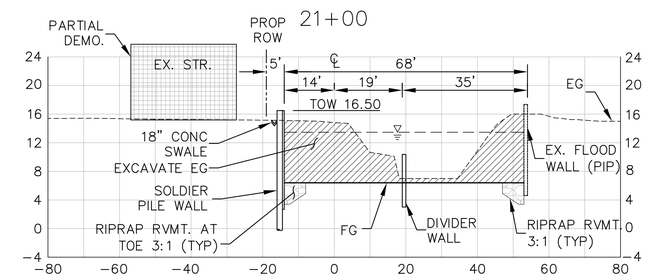

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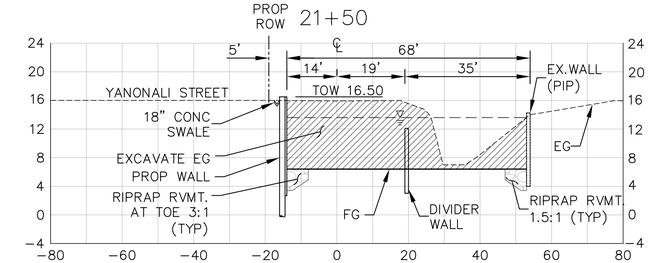

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REVISIONS

MARK	DESCRIPTION	DATE	APPR.

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTIRCT
123 E. ANAPAMU STREET
SANTA BARBARA, CA 93101
805.568.3440

TETRA TECH
800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B

CROSS SECTIONS (1)

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME:
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC10
SHEET 10 OF X

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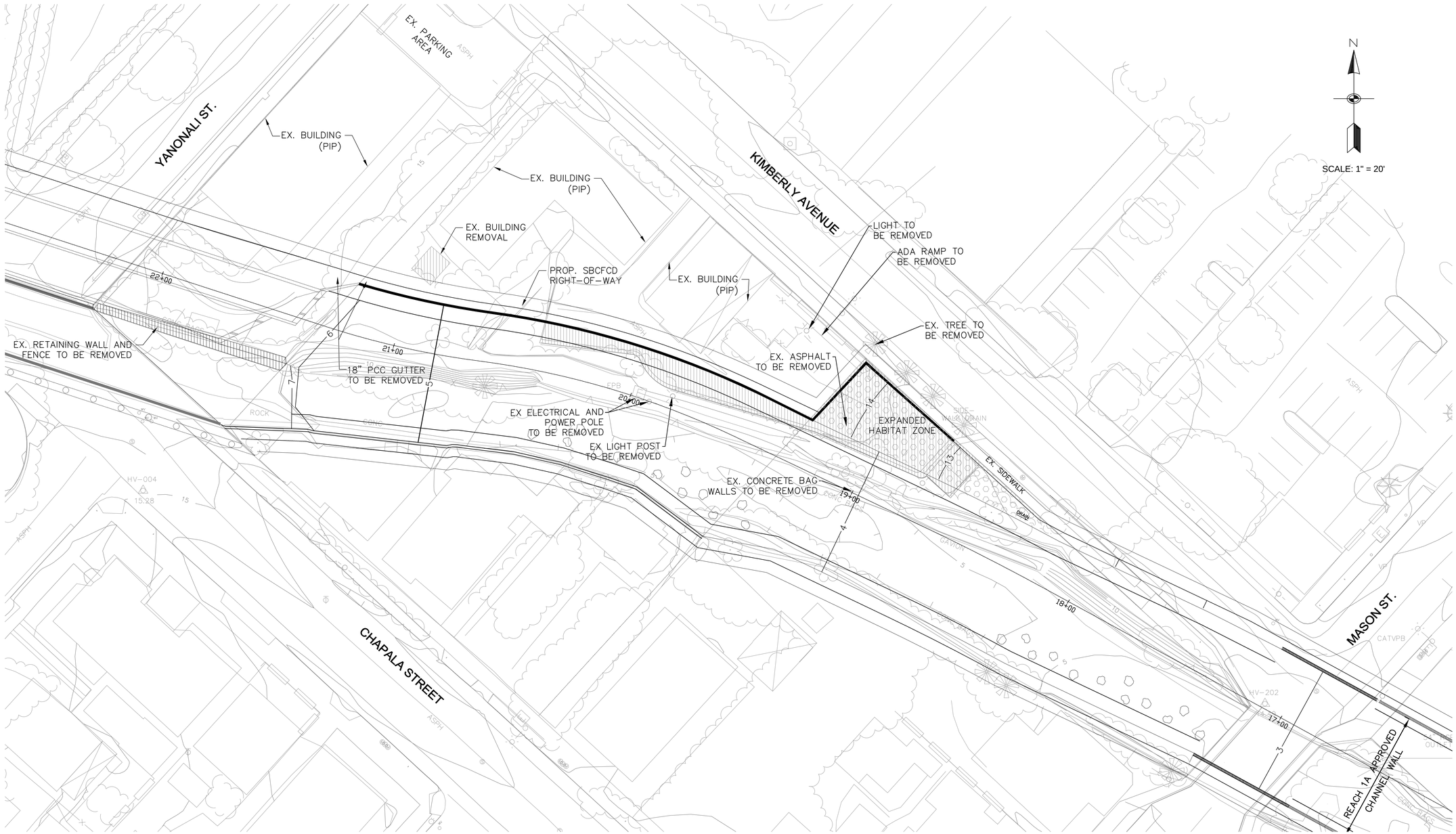

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SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTIRCT
123 E. ANAPAMU STREET
SANTA BARBARA, CA 93101
805.568.3440

TETRA TECH
800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B
DEMOLITION PLAN

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME:
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC11
SHEET 11 OF X

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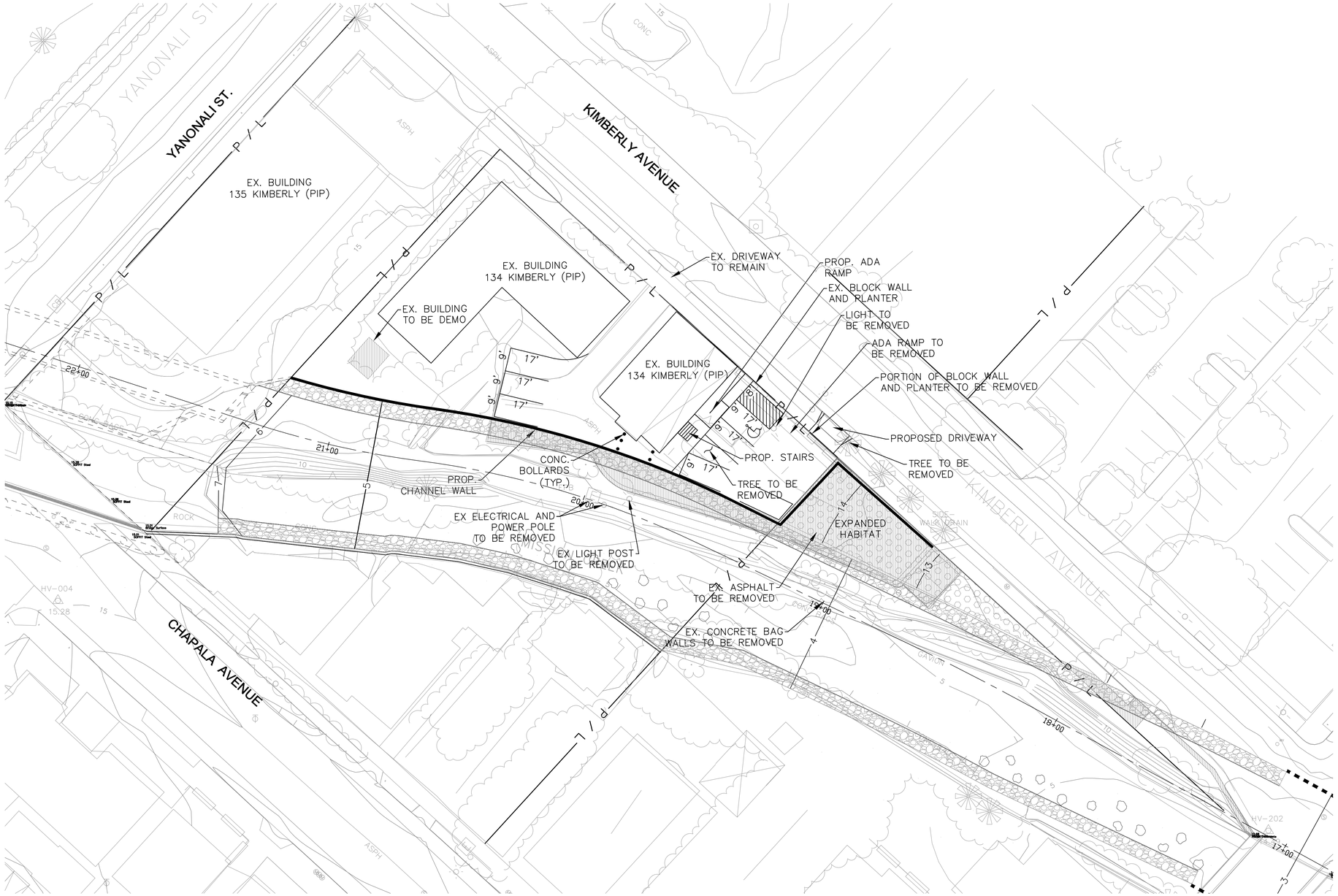

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REVISIONS

MARK	DESCRIPTION	DATE	APPR.

SANTA BARBARA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTIRCT
123 E. ANAPAMU STREET
SANTA BARBARA, CA 93101
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800 WEST SIXTH STREET, SUITE 380
LOS ANGELES, CA 90017 213.327.0800

ARIC M. TORREYSON R.C.E. 66068 DATE

SANTA BARBARA COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT

LOWER MISSION CREEK FLOOD CONTROL PROJECT
REACH 1B
PROPERTY DETAIL PLAN (1)

DATE: AUGUST 2012
SCALE: AS SHOWN
FILE NAME:
DESIGNED BY: AG
DRAWN BY: AG
CHECKED BY: YHC

SHEET REFERENCE NUMBER
FC12
SHEET 12 OF X

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APPENDIX 6

2001 LMC Goby BO - Permit

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ventura Fish and Wildlife Office
2493 Portola Road, Suite B
Ventura, California 93003

June 1, 2001

Robert E. Koplin
Los Angeles District, Corps of Engineers
Department of the Army
P.O. Box 532711
Los Angeles, California 90053-2325

Subject: Biological Opinion for the Lower Mission Creek Flood Control Project, Santa Barbara County, California (1-8-00-F-74)

Dear Mr. Koplin:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion on the U.S. Army Corps of Engineers' (Corps) Lower Mission Creek Flood Control Project (Project) located in the city of Santa Barbara, Santa Barbara County, California, and its effects on the endangered tidewater goby (*Eucyclogobius newberryi*). This biological opinion has been prepared in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). We received your June 21, 2000 request for formal consultation on June 22, 2000.

This biological opinion is based on the information provided in your June 21, 2000, request for consultation, your biological assessment pertaining to the tidewater goby, previous documents submitted by the Corps in support of the consultation, communications with experts on the species, communications between staff of the Corps and the Service, and our files. A complete administrative record for this biological opinion is on file at the Ventura Fish and Wildlife Office.

CONSULTATION HISTORY

We have been involved with the Corps on the proposed Project since June, 1999, as part of a Fish and Wildlife Coordination Act agreement (Service 1999). We commented on the proposed Project in a draft Fish and Wildlife Coordination Act Report, which was sent to the Corps in December of 1999. The Corps submitted a biological assessment in December, 1999, along with a draft environmental impact statement/environmental impact report. Subsequent to this submission, the proposed Project was modified and a revised biological assessment was submitted, along with the June 21, 2000, request for consultation. On May 3, 2000, we sent the final Fish and Wildlife Coordination Act Report to the Corps. Additionally, in March, 2000, the

U.S. Department of the Interior Office of Environmental Policy and Compliance sent comments on the proposed Project to the Corps.

The Corps initiated formal consultation in a letter dated June 21, 2000, and we issued a biological opinion to the Corps on February 16, 2001. During its review of the document, the Corps realized that the ongoing maintenance was not addressed because of direction received by the Service stating that the Santa Barbara County Flood Control District (County) would be responsible for this activity. In a discussion on February 22, 2001, the Corps informed the Service that maintenance was in fact part of the proposed project. In response to the new information and other concerns, the Corps requested that the Service prepare a draft biological opinion that would include an analysis of the construction phase of the project as contained in the original February 16, 2001, version, and an analysis of the effects of the continued maintenance of the project.

Following its review of the draft biological opinion, which we provided on March 20, 2001, the Corps presented additional concerns. In particular, the Corps had stated during preparation of the draft biological opinion, that the Service need not consider long-term, future maintenance as a covered activity in this consultation. Consequently, we did not include a discussion of maintenance in the draft biological opinion. In a meeting on April 18, 2001, the Corps requested that the long-term mantenance be added to the final biological opinion. Additionally, the Corps informed the Service that the Corps does not issue itself a permit for civil works projects; however, the County, in its responsibility for long-term maintenance, has applied for a section 404 general permit for continued activities. The duration of the section 404 permit would be determined by the Corps' regulatory branch. This new information is included in this biological opinion.

The Corps and the National Marine Fisheries Service have completed formal consultation for the federally endangered steelhead trout (*Onchorynchus mykiss*) which also occurs in Mission Creek.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The purpose of the proposed Project is to increase the flood carrying capacity in Mission Creek to 3,400 cubic feet per second (cfs). The proposed Project would cover approximately a mile of Mission Creek between Cañon Perdido Street Bridge at the upstream end and Cabrillo Boulevard Bridge at the downstream end (figure 4 from Corps 2000, enclosed). Presently, this section conveys approximately 1,050 cfs and is prone to frequent flooding. The changes to lower Mission Creek would include the widening of the creek, replacement of bridges, streamlining bedslope, stabilizing and protecting creek banks using vertical walls and vegetated riprap sideslopes, and installing an overflow culvert that bypasses the oxbow between Highway 101 and the Chapala Street Bridge. The widened creek would generally follow the existing alignment. Sections with natural creek bottom would be maintained and, in some sections, existing concrete

bottom would be restored to a natural bottom. According to the biological assessment (Corps 2000), the project would alter the net sediment budget by capturing more fine materials upstream.

The Project components that could affect the tidewater goby include excavation, construction, and maintenance.

Excavation and Construction

The Corps anticipates that the excavation and construction could be completed in approximately two years. Inclement weather, funding constraints, mechanical failure, or other unexpected events may extend this time frame. Specific excavation and construction activities that could affect tidewater gobies are as follows:

1. Bank Removal and Excavation - All existing banks would be removed in the project area with the exception of a retaining wall located just upstream of the De la Guerra Street Bridge and along the oxbow between Highway 101 and the Chapala Street Bridge. The creek bottom would also be excavated in the proposed Project area to widen the channel. The total amount of material to be excavated from both the creek bottom and the banks is estimated at 246,000 cubic feet. Excavated material would be partially stockpiled in a staging area located along the creek bank and the remaining material, approximately 192,000 cubic feet, would be recycled or transported to disposal sites located within a radius of 10 to 20 miles from the proposed Project site. The Corps estimates that 51,000 to 54,000 cubic feet of material would be used in Project construction as fill material. Usable earthen material may be reused as backfill or cover for the riprap slope. The Corps estimates that channel excavation will likely require 130 to 180 days to complete.

2. Bank Protection - Existing bank protection would be replaced with either a vertical wall (toe wall) or a combination of vertical wall and vegetated riprap sideslope. The upper half of the vegetated riprap sideslope would be sloped back with concrete pipes in varying sizes placed to allow the planting of native trees and vegetation. Wherever this combination of toe wall and vegetated riprap sideslope is used, the vertical height of the toe wall would be half the depth of the creek. For example, if the depth of the creek is 8 feet, the toe wall would be 4 feet tall, with the remainder being vegetated riprap. Below Highway 101, this combination toe and vegetated riprap would be used along the southeast bank, starting from the midpoint between Chapala and Mason Street Bridges down to the midpoint between the Mason and State Street Bridges. Vertical walls would be applied or maintained for the remainder of the downstream Project area. Above Highway 101, the combination toe wall and vegetated riprap would be the primary bank protection modification, with the exception of two short reaches just upstream of the Haley-De la Vina Bridge and the De la Guerra Bridge.

3. Replacement of Existing Bridges - Four bridges in the proposed Project area would be removed and replaced. Those are Ortega Street, Cota Street, De la Vina Street, and

Mason Street. Minor modifications of other bridges may be required to increase conveyance capacity.

4. Weir Inlet and Overflow Culvert - A reach of lower Mission Creek known as the "oxbow" runs between the Guiterrez and Chapala Street Bridges. The Corps proposes to build a weir inlet and overflow culvert beginning immediately downstream of the Guiterrez Street Bridge. The weir inlet would be constructed to allow flows only during storm events (greater than 640 cfs). From the weir inlet, storm flows would flow into an overflow culvert. The culvert would essentially connect both ends of the oxbow. The California Department of Transportation has built a culvert span across Highway 101 so traffic is not affected during storm events. The culvert would also cross beneath Montecito Street and the railroad tracks before rejoining the creek downstream of the Chapala Street Bridge. Downstream of the Montecito Street Bridge, the culvert would be buried (figure 4 from Corps 2000).

5. Rock Energy Dissipaters and Boulder Clusters - Three reaches of lower Mission Creek would be modified using a dissipater design consisting of the placement of large boulders and riprap. The first location would be from Cañon Perdido Street to below the De la Guerra Street Bridge. The second location would be from upstream of the Gutierrez Street Bridge downstream to the upper bend of the natural oxbow, near Highway 101. The third reach would be at the outlet of the overflow culvert. This design would basically include the placement of riprap into the widened creek channel, along with the embedding of large boulders three to four feet in diameter arranged in clusters in the riprap. This design is intended to dissipate the force of currents at vulnerable places along the creek and improve habitat for the steelhead trout.

6. Expanded Habitat Zones - The proposed Project may have as many as five small parcels of land that would be used for planting native riparian vegetation and as small recreational park space. The parcels of land in consideration range from 0.03 to 0.52 acre. Final calculations for the proposed Project channel configuration would determine how much of this space is available for planting. Native riparian trees obtained from local nursery stock would be planted in the habitat expansion zones. In some of these zones, pathways and benches may also be added.

   Another habitat expansion zone may be created near the oxbow formation area. However, because the area has been contaminated from past use by a dry cleaning business, it would have to be remediated prior to the construction of a habitat expansion zone. The area is approximately 0.6 acre in size. Finally, the vertical toe and vegetated riprap design is also considered as habitat expansion by the Corps, as vegetated riprap is currently lacking in most stretches of lower Mission Creek.

7. Structural Features to Minimize and Avoid Impacts to Biological Resources - To minimize the effects of the action on the tidewater goby and the steelhead, the Corps has

incorporated several structural features as part of the channel widening. The Corps has designed "hiding" places where fish can take refuge. These hiding places include coarse surface relief built into the lower sections of vertical walls as tidewater goby refugia, concrete overhangs projecting out from the vertical wall (fish ledges), and placement of double rows of coarse boulders between the overhangs along the vertical walls (fish baffles). A combination of these three features would be placed within the Mission Creek estuary between Mason Street and Cabrillo Boulevard on both sides. The ledges and baffles design would be used throughout the remainder of the proposed Project reach. More baffles than ledges would be placed.

Maintenance of the Project Area

The biological assessment describes maintenance in two areas:

1. Upstream Sediment and Vegetation Management - Sediment and vegetation will be removed periodically from the Mission Creek channel above the Yanonali Street sill. None of this perpetual maintenance would take place within the estuary. The County would conduct maintenance in the same manner that it has for many years. The upstream maintenance activities would not change under the project, with the exception of those measures included in the Corps' maintenance manual; *i.e.*, sediment and vegetation would only be removed between August and October, when the creek is generally dry and, if any flow is present, silt fences would be installed during removal of sediment and vegetation. The Corps' maintenance manual for the Mission Creek project will incorporate all measures specified in the environmental impact statement prepared for the project, the 404 permit to be issued to the County for long-term maintenance, and the terms and conditions of this biological opinion.

   The upstream maintenance would not be performed every year unless conditions warrant. The sediment removal would only occur when the capacity of the flood control channel has been reduced by 15 percent.

2. Downstream Vegetation Management - The Corps would be responsible for maintenance of vegetation, including that in the Expanded Habitat Zones described above and the plantings to be performed as beneficial measures, described below. All of this maintenance would occur downstream of the Yanonali Street sill. The proposed monitoring of vegetation includes documentation of vegetation growth. If the plants do not meet pre-determined growth and survival rates [as specified in the biological assessment (Corps 2000) and incorporated herein by reference], the Corps would implement actions to improve growing conditions, such as fertilizer, increased irrigation, and replanting. Periodic augmentation of soil in the vegetated riprap may be accomplished by using sediment removed from clearing activities or importing soil from other areas.

For the first year after completion of construction and planting, monitoring would occur every three months, the second year every four months, and the third, fourth, and fifth year every six months. The Corps would do the maintenance for the first five years following construction. Thereafter, the Corps has assumed that the vegetation will not require maintenance but will be self-sustaining. Although some mortality is expected over the long-term, only in the event of bank failure and necessary reconstruction would vegetation be replaced by the County.

In addition to the activities described above, the project would include measures that would be implemented to avoid and minimize some adverse effects to tidewater gobies. The proposed minimization measures include the following:

1. Native Vegetation Planting - The Corps would plant native vegetation below the Yanonali Street bridge in the areas that have been excavated or recontoured, and where such plantings would be appropriate. Planted vegetation would consist of native trees, shrubs, and grasses. A Project biologist would coordinate the planting of vegetation. A temporary above-ground irrigation system would be installed to irrigate planted vegetation. The irrigation system would be used for a maximum of three years. Irrigation water would come from municipal sources and the Corps would ensure that planted vegetation is watered sufficiently. The Corps estimates that riparian vegetation would reestablish to its current height and thickness within 3 to 5 years and that the structural complexity and diversity equal to typical coastal stream habitat would be attained within 30 years.

   Giant reed (*Arundo donax*) and other non-native vegetation would be first removed by hand, then treated with an application of glyphosate herbicide via cutting of stems to the ground and painting of exposed surfaces, as needed. Large western sycamores (*Platanus racemosa*) would be retained where feasible.

2. Creek Dewatering Practices - Impacts to the tidewater goby would result from the necessity to dry the streambed and toe of banks prior to construction between Cabrillo Boulevard and Yanonali Street. To minimize the impact caused by drying the streambed, the Corps proposes to time the construction activity outside of the tidewater goby spawning period, conduct dewatering and construction in only half of the streambed at a time, and relocate tidewater gobies that remain in the construction area.

   The dewatering of half the streambed would be accomplished by dividing the creek and estuary length-wise using an impermeable barrier, such as sheet piling. At the upstream end of this barrier, half the estuary would be dammed to allow water to continue to flow through the other half of the creek/estuary. Once this is done, qualified biologists would walk downstream in a zig-zag pattern to herd as many tidewater gobies as possible downstream. When the tidewater gobies have been herded downstream, an exclusion dam would immediately be lowered to seal off their re-entry into the work area. The

biologists would once again enter the confined area and seine the streambed to capture any remaining tidewater gobies. If tidewater gobies are captured, they would be relocated to the wet side of the estuary. When this process has been completed, the confined area would be pumped of any remaining water with an intake hose covered with a half-inch mesh screen. Biologists would monitor the drying of the confined area and seine it thoroughly at least twice a week if necessary. This process would be repeated for the other side of the creek once the project on one side is completed.

Mechanized equipment would enter the creek via existing parking lots at Cañon Perdido and Cota Streets or the area immediately adjacent to the oxbow. To minimize contamination of the creek by heavy equipment, the Corps proposes to inspect equipment for leaks and drips on a daily basis prior to the commencement of work. A storm water pollution prevention plan would also be prepared to minimize the potential discharge of oil or grease into the creek. Best management practices (BMPs) would be followed during construction and excavation. No work, outside of the placement of impermeable barriers, dams, and culverts, would be allowed in flowing water except as absolutely necessary.

Upstream of Yanonali Street, where tidewater gobies are not found, the streambed would be dewatered using a system of in-channel culverts and the Corps would place a series of silt curtains immediately below the construction area in an effort to reduce suspended sediments in the creek. The culverts would be at least 24 inches wide and no longer than 300 feet.

Prior to construction, the construction crews would be briefed on the environmental commitments. The Corps, or a Corps contractor, would monitor the construction contract bi-weekly during the initial stages of construction to ensure compliance with various conditions. Finally, during construction of the proposed Project, the Corps, or a Corps contractor, would monitor turbidity levels within the creek water.

3. Beneficial Effects - The Corps believes this Project would benefit the tidewater goby by doubling the size of the estuary as a result of removing bank stabilization structures and widening the channel, and by reducing siltation into the estuary. Additionally, the Corps believes the toe wall design features in the estuary would provide refugia for tidewater gobies.

STATUS OF THE SPECIES

The tidewater goby was listed as endangered on March 7, 1994 (59 Federal Register 5494). A recovery plan has not been published. On June 24, 1999, the Service proposed to delist the remaining northern populations of the tidewater goby because we concluded the listing exaggerated the risk of extinction by overestimating the rate of local population extinction and the northern populations of the tidewater goby are not presently in danger of extinction or likely

to become in danger of extinction within the foreseeable future (64 Federal Register 33816). In the proposal to delist the northern populations, the Service defined a southern distinct population segment (DPS) as those populations occurring in San Diego and Orange counties. Critical habitat was designated for this DPS on November 20, 2000 (65 Federal Register 224). A final determination on delisting the northern populations has not been made at this time. Detailed information on the biology of the tidewater goby can be found in Wang (1982), Irwin and Soltz (1984), Swift *et al.* (1989), Worcester (1992), and Swenson (1995); much of the information from this account was taken from these sources.

The tidewater goby is a small, elongate, grey-brown fish not exceeding two inches standard length. The species, which is endemic to California, is typically found in coastal lagoons, estuaries, and marshes with relatively low salinities (approximately ten parts per thousand (ppt)). Its habitat is characterized by brackish shallow lagoons and lower stream reaches where the water is fairly still but not stagnant. However, tidewater gobies can withstand a range of habitat conditions; they have been documented in waters with salinity levels from 0 to 42 ppt, temperatures from 46 to 77 degrees Fahrenheit, depths from 10 inches to 6 feet or more, and dissolved oxygen levels of less than one milligram per liter.

Tidewater gobies may, at times, range upstream into fresh water, up to one and a half miles from an estuary. In San Antonio Creek and the Santa Ynez River, Santa Barbara County, tidewater gobies are often collected four to five miles upstream of the tidal or lagoonal areas, sometimes in beaver-impounded sections of streams. Conversely, tidewater gobies enter marine environments if sandbars are breached during storm events. The species' tolerance of high salinities (up to 60 ppt for short periods) likely enables it to withstand the marine environment and to colonize or re-establish in lagoons and estuaries following flood events, as has been recently hypothesized (Lafferty *et al.* 1999a, b).

The tidewater goby is primarily an annual species in central and southern California, although some variation has been observed. If reproductive output during a single season fails, few if any tidewater gobies survive into the next year. For this reason, populations can be sensitive to short-term adverse environmental conditions. In one notable case, a population estimated at between 10,000 and 30,000 individuals was extirpated after a single construction project (Swift and Holland 1998). However, recent research suggests that tidewater gobies have adapted to climatically dynamic conditions and are adept at recolonizing sites from which they have been extirpated (Lafferty *et al.* 1999a).

Reproduction peaks from late April or May to July and can continue into November or December depending on the seasonal temperature and rainfall. Males begin the breeding ritual by digging burrows (four to five inches deep) in clean coarse sand and silt. Females then deposit eggs into the burrows, laying an average of 400 eggs per spawning effort (Swenson 1999). Males remain in the burrows to guard the eggs. Males frequently forgo feeding during this period, possibly contributing to the mid-summer mortality noted in some populations. Within nine to ten days, larvae emerge. The larvae live in vegetated areas within the lagoon until they are 0.75 inch SL,

when they become substrate oriented, spending the majority of time on the bottom rather than in the water column. Both males and females can breed more than once in a season, with a lifetime reproductive potential of 3 to 12 spawning events.

Tidewater gobies feed on small invertebrates, usually mysids, amphipods, ostracods, snails, and aquatic insect larvae, particularly dipterans, most of which live in the sediments. Small tidewater gobies probably feed on unicellular phytoplankton or zooplankton similar to many other early stage larval fishes (Swenson and McCray 1996).

Historically, the tidewater goby occurred in at least 110 California coastal lagoons from Tillas Slough near the Oregon border to Agua Hedionda Lagoon in northern San Diego County. The southern extent of its distribution has been reduced by approximately eight miles. The species is currently known to occur in about 85 locations, although this number will decrease during severe drought conditions. Today, the most stable populations are in lagoons and estuaries of intermediate sizes (5 to 124 acres) that have remained relatively unaffected by human activities. These populations have probably provided colonists for nearby smaller ephemeral sites (Swift *et al.* 1997, Lafferty *et al.* 1999b).

Losses of tidewater goby populations can be attributed primarily to urban, agricultural and industrial development in and surrounding coastal wetlands and alteration of habitats from seasonally closed lagoons to tidal bays and harbors. Some extirpations are believed to be related to pollution, upstream water diversions, and the introduction of exotic fish species (most notably sunfishes and black basses [Centrarchidae]). These threats continue to affect some of the remaining populations of tidewater gobies. Tidewater gobies have been extirpated from several water bodies that are impaired by degraded water quality (*e.g.*, Mugu Lagoon, Ventura County), but still occur in others (*e.g.*, Santa Clara River, Ventura County).

ENVIRONMENTAL BASELINE

The estuary of Mission Creek is a relatively small California coastal estuary. It extends from the small lagoon formed at its mouth to the sill at Yanonali Street. The size of the lagoon expands and contracts with given amounts of rainfall and whether it has breached to the ocean, but typically rarely exceeds five acres. The lower portions of Mission Creek lie within urbanized Santa Barbara. The Mission Creek drainage originates from the Santa Ynez Mountains in the Los Padres National Forest. The drainage, including its tributaries, is approximately 11.5 square miles in size (Service 2000a). The lower reaches of Mission Creek are typically dry in the summer months, although urban runoff keeps small amounts of water moving through the creek. During the summer months, the City of Santa Barbara traditionally manually breached the Mission Creek lagoon due to health and safety concerns; however, upon being notified in 2000 that this activity was not permitted, the City ceased the breaching. During high rainfall years, lower Mission Creek is prone to overtopping its banks and high flow velocities.

Over several decades, crude bank protection has been attempted through the placement of grouted stone, sacked concrete, pipe and wire revetment, gabions, bulkhead structures, and other stabilization structures. These stabilization structures are randomly placed throughout lower Mission Creek. The combination of adjacent buildings and bank stabilization has modified the natural characteristics of lower Mission Creek and its habitat. The sheltering from the wind prevents adequate mixing of the surface with deeper water, resulting in stratification of salinity and dissolved oxygen uncharacteristic of similar estuaries where man-made structures are not present (Swift 2000).

The substrate of the Mission Creek estuary varies from the sill at Yanonali Street down to the lagoon below Cabrillo Boulevard. Within the area of concern in the biological opinion, Swift (2000) characterizes the conditions as follows:

> "From this point (the railroad bridge) downstream to Chapala Street the bottom was flat, hard, carved sandstone of historical significance. The sandstone had a veneer of sand and algae in water mostly 10-15 cm (4-6 inches) deep with about 10% deeper pools to 30 cm (12 inches) deep. At Chapala, the flat sandstone bottom ends in a 30-40 cm falls into the upper end of the lagoon. On the June 8 visit the lagoon was at a higher level, standing about 15 centimeters (6 inches) above the top of the "falls" and extended 5-10 meters (16-33 feet) farther upstream. The upper lagoon has mostly rocks and gravel downstream to and beyond the Mason Street Bridge and becomes progressively less rock and more sand to the sand berm separating the lagoon from the ocean."

Tidal influence extends to a 1.5-foot high sill (Swift's "falls") which spans the entire channel at the Yanonali Street Bridge; therefore, the estuary extends from the lagoon upstream to the sill. As mentioned in the description of the proposed project, the sill at Yanonali Street probably blocks further upstream movement by the tidewater goby so that the species' distribution in Mission Creek coincides with the estuary or extends up to the Yanonali Street sill.

Swift (2000) goes on to say that the presence of rock and boulders in the area above Cabrillo Boulevard indicates that Mission Creek is "sediment-starved." He concludes that the sand and sediment in the lower estuary and lagoon must be coming from the ocean, deposited by wave action, and that the periodic breaching performed in the past by the City of Santa Barbara reduced the suitable substrate available to tidewater gobies.

Vegetation in the proposed Project area is dominated by opportunistic invasive plants such as giant reed, castor bean (*Ricinus communis*), and tree tobacco (*Nicotiana glauca*) with only remnant stands of native riparian vegetation. Salt cedar (*Tamarix* sp.), a highly invasive species, has been found in the creek channel (Service 2000a). The proposed Project area supports small patches of native vegetation including western sycamores, coast live oak (*Quercus agrifolia*), cottonwood (*Populus* spp.), and native willows (*Salix* spp.).

During the summer months, salinity levels in the estuary typically range between 20 and 30 ppt. During winter months, salinity levels are lower and at times approach completely fresh regimes. Turbidity in the estuary has been measured between 1 and 10 nephelometric turbidity units with winter months yielding the highest turbidity, as expected (Service 2000a). Bacterial contamination of Mission Creek may be the result of adjacent urbanization, homeless encampments near the creek, and birds using the lagoon. Measurements taken in 1998 show elevated levels of total coliform, fecal coliform, and enterococcus (Project Clean Water 1999). The estuary sediment closest to the ocean is composed mostly of fine and coarse sands. The estuary does not contain tidal mud flats and is devoid of estuarine vegetation.

The Santa Barbara County Parks and Recreation Department ((PRD) has manually breached the Mission Creek estuary for nearly 40 years when odors from the estuary became noxious and bacterial contamination became a concern. The PRD has not obtained federal permits for this activity. Recently, the PRD contacted the Corps to begin the permitting process for this breaching activity. The PRD has also contacted the Service to discuss ways in which the breaching could be done to minimize adverse effects to the tidewater goby.

According to Swift (2000), tidewater gobies have been known to occur in Mission Creek since 1993. In 1994, Lafferty and Alstatt (1995) observed tidewater gobies within the estuary above Cabrillo Boulevard. A tidewater goby survey was conducted in the estuary in May and June of 1999, but no tidewater gobies were captured (Service 2000b). Swift (2000) reports that he found the species in Mission Creek on May 10, 2000. These observations show that tidewater goby numbers at any given location may fluctuate from year to year, so absence in one survey year does not necessarily indicate extirpation of the population. The tidewater goby population in Mission Creek may be transient. The changing conditions of the estuary (*i.e.*, periodic drying, poor water quality, breaching of the lagoon mouth) may extirpate the population in a given year, with recolonization from nearby populations occurring in favorable years. We do not have enough data to make conclusions about the persistence of the Mission Creek population.

According to Swift (2000), the success of the tidewater goby population depends upon the amount of coarse sand substrate available for breeding. Much of the substrate suitable for breeding is in the lower portion of the lagoon, downstream of the Cabrillo Boulevard bridge. Therefore, breeding by tidewater gobies in Mission Creek is not extensive and could be greater with some changes that would enlarge the lagoon. When the lagoon is breached, suitable habitat for breeding is further reduced; at these times, tidewater gobies may be limited to the deepest pools above Cabrillo Boulevard, although breeding may not be possible in these pools because of the unsuitable substrate.

EFFECTS OF THE ACTION

The most direct adverse effect of the action would be the sequential drying of one half of the creek bed and relocation of stranded tidewater gobies. During this activity, tidewater gobies may be killed or injured from trampling by workers, crushed during the placement of impermeable

barriers and dams, dessicate and suffocate in a dewatered section of the creek bed, be subject to increased predation during the drying and relocation process, or may die during the actual handling and relocation process. Additionally, as water is being pumped out of one section of the creek, tidewater gobies may be injured or killed by impingement onto the pump screen. These direct effects would only occur during construction in the estuary.

Another possible effect on the tidewater gobies would include impairment of respiration as a result of suspended sediments being released during construction and maintenance in the creek bed and on creek banks. The Corps has proposed to minimize the release of fine sediments into Mission Creek during construction by installing silt-fencing. The suspension of fine sediments during maintenance would be minimized by limiting such work to the dry season and the use of silt fencing, as needed.

Contamination of tidewater goby habitat may occur during the application of herbicides, spills and leaks from construction equipment, spills of fertilizers which may be used to augment the growth of planted vegetation, or release of buried substances during creek and creek bank excavation or removal of adjacent structures. Contamination to tidewater goby habitat may result in acute or chronic mortality, degradation of habitat through reduction in prey items, or, in the case of fertilizer releases, eutrophication. The Corps has proposed minimization measures to reduce the possibility of accidental spills of all kinds into tidewater goby habitat. These measures include timing of Project construction and sediment removal between April and October when water flow is minimal, not allowing work in flowing water unless absolutely necessary, placing silt-fencing during routine maintenance activities, using existing access points, ensuring that construction equipment is in good working order and inspected for leaks and drips on a daily basis prior to commencement of work, and developing a storm water pollution prevention plan to prevent discharges of oil or grease into the creek. Given the minimization measures, contamination of tidewater goby habitat is not likely.

The proposed Project may also disrupt the foraging base of tidewater gobies in Mission Creek which may result in a reduction of prey items. Impacts to prey items may occur as water levels are manipulated, thereby altering the hydrology of the creek and estuary. Temporary pulses of suspended sediment during construction and maintenance (*i.e.*, sediment removal) above the sill may cover and suffocate bottom-dwelling organisms. A reduction in prey items may lead to increased competition for food and a reduction in the ability of Mission Creek to support tidewater gobies. Bottom-dwelling organisms would likely begin to recover once construction is complete or during the period between maintenance actions.

We do not anticipate that the maintenance practices would adversely affect tidewater gobies. The proposed avoidance and minimization measures (*i.e.*, restricting work to low flows periods, use of silt fences) are likely to be effective at preventing sudden turbidity and contamination that could harm tidewater gobies. We do not know if past management practices in areas upstream of the estuary, which will continue unchanged under the project, had an effect on the tidewater goby or its habitat; we do not have enough data on the population to know how persistent it has been or if the estuary substrate was affected.

The Corps has included a variety of minimization measures to reduce adverse effects to tidewater gobies during construction and has incorporated structures intended to act as refugia for individuals of the species into the project design. However, the project introduces uncertainties pertaining to the long-term adverse effects on the physical structure of tidewater goby habitat:

1. The tidewater goby refugia, although novel in concept, have not yet been tested and proven to provide benefits to the species during periods of above average flow. We remain uncertain as to the beneficial effects the refugia will provide.

2. In its biological assessment, the Corps (2000) concluded that the project would result in the loss of suitable spawning habitat in the Mission Creek estuary. The Corps predicted that the proposed project would likely result in the reduction of fine sediments in the bedload and the expansion of the gravelly and rocky substrate as a result of the improved efficiency of the flood control functions upstream of the estuary. Overflow from the proposed bypass culvert would be cleaner (*i.e.*, not carrying fine sediments) and would actually remove fine sediments from tidewater goby habitat in the estuary. During discussions on February 22, 2001, the Corps stated that the shift from fine to coarser substrate in the estuary would occur only during high flows, when the bypass and the weir were functioning as intended. The Corps also stated that the influx of fine sediments may return to the estuary under normal flow conditions upstream.

   Upon revisiting Swift's (2000) report and after discussions with the Corps on April 18, 2001, we have concluded that the conversion to a gravelly and rocky substrate would only affect the tidewater goby's foraging habitat. The area of suitable spawning habitat would be unlikely to change because, according to Swift (2000), most of the fine sand and sediment which is an important component for the structural stability of tidewater goby reproductive burrows, comes from the ocean side of the lagoon and not from the flows in Mission Creek. Consequently, we conclude that the project would not substantially alter the available spawning habitat for tidewater gobies.

   The need for fine sediments should not be confused with sudden, harmful plumes of sediment that can result from construction or maintenance. These sudden siltation events may be deleterious because the water level is likely to be low and the sediments concentrated, thus suffocating both the tidewater gobies and their prey. These plumes of sediment will not contribute to the spawning habitat in the lagoon.

Based upon the information available to us regarding the likely consequences of the proposed action, the ecology of the tidewater goby, and the uncertainty of the status of the species in Mission Creek due to a lack of data, we cannot predict with certainty whether the species will persist in the Mission Creek estuary. In any case, the tidewater goby population in Mission Creek is likely to experience some change in the existing habitat conditions as a result of the project. However, Swift (2000) states that tidewater gobies would derive the greatest benefit from measures that affect water depth, salinity, and substrate in the lagoon, which is outside of the project area and would be unaffected by the Corps' proposed actions.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. We are unaware of any non-federal activities within the action area that are reasonably expected to occur.

CONCLUSION

After reviewing the current status of the tidewater goby, the environmental baseline for the action area, the effects of the proposed Project, and the cumulative effects, it is our biological opinion that the Lower Mission Creek Flood Control Project, as proposed, is not likely to jeopardize the continued existence of the tidewater goby. We have reached this conclusion because the project is unlikely to result in the permanent extirpation of the species from Mission Creek. Also, the Corps and County will implement measures to minimize adverse effects, and the quality of the spawning habitat will not be substantially affected by the project. Lastly, the tidewater goby currently occurs in approximately 85 streams and the loss of the population in Mission Creek, however unlikely, would not appreciably reduce the ability of the species to survive and recover.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act, provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary and the Corps must ensure they are implemented during any activity that it or its contractor undertakes for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps fails to adhere to the terms and conditions of the incidental take statement or fails to ensure that its contractor adheres to them, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Corps must

report the progress of the action and its impact on the species to us as specified in the incidental take statement [50 CFR §402.14(I)(3)].

The Service anticipates that individuals of all life stages of the tidewater goby within the Mission Creek estuary, from the lagoon upstream to the Yanonali Street sill, may be taken through the combined effects of direct mortality or injury as a result of project activities, long-term modification to tidewater goby habitat upstream of Cabrillo Boulevard, and handling during removal from work areas. The exact number of tidewater gobies that could be affected cannot be predicted because of the natural fluctuations in numbers that this species experiences and the difficulty in determining how many individuals are present at any given time. Incidental take of tidewater gobies would be minimized to the extent possible during excavation, construction, and maintenance with full implementation of the avoidance and minimization measures proposed by the Corps.

REASONABLE AND PRUDENT MEASURES

The Service believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of tidewater gobies:

1. The Corps shall retain the services of a qualified biologist to implement protective measures for the tidewater goby and to provide an education program to all personnel working in the estuary.

2. A qualified biologist shall be retained to conduct pre-construction surveys and to monitor the estuary to determine the status of the tidewater goby in Mission Creek after completion of the project.

3. The diversions required during construction and maintenance shall incorporate protective measures to minimize tidewater goby mortality.

The Service's evaluation of the effects of the proposed action includes consideration of the measures developed by the Corps, and repeated in the Description of the Proposed Action portion of this biological opinion, to minimize the adverse effects of the project to the tidewater goby. Any subsequent changes in the minimization measures proposed by the Corps may constitute a modification of the proposed action and may warrant re-initiation of formal consultation, as specified at 50 CFR 402.16. These reasonable and prudent measures are intended to clarify or supplement the protective measures that were proposed by the Corps as part of the proposed action.

TERMS AND CONDITIONS

To be exempt from the prohibitions of section 9 of the Act, the Corps shall comply with or ensure that its contractor complies with the following terms and conditions, which implement the

reasonable and prudent measures described above and outline reporting and monitoring requirements. These terms and conditions are non-discretionary:

The following terms and conditions implement reasonable and prudent measure 1:

1. The Corps shall submit to the Service in writing, at least four weeks prior to the onset of work, the qualifications of a biologist familiar with tidewater goby biology. This biologist will be responsible for implementing measures that involve handling and relocating tidewater gobies. The Service will provide written authorization of the individual, if qualified, or denial, if unqualified.

2. The qualified biologist shall conduct a training session for all personnel associated with construction in the estuary prior to the onset of work. At a minimum, the training shall include a description of the tidewater goby and its habitat; the general provisions of the Act; the necessity for adhering to the provisions of the Act; the penalties associated with violating the provisions of the Act; the specific measures that are being implemented to conserve the tidewater goby as they relate to the project; and the boundaries of the project within which it may be accomplished.

The following term and condition implements reasonable and prudent measure 2:

3. The authorized biologist shall complete initial surveys for tidewater gobies in Mission Creek one week prior to the onset of work. After the construction phase of the project has been completed and then annually for a period of five years, a qualified biologist shall conduct surveys for tidewater gobies to determine their status. Surveys shall be conducted as follows:

    a. Monitoring surveys shall be conducted at the same time each year, the time of which will have been determined by surveys conducted prior to the onset of work, as described above.

    b. Five survey locations shall be identified for the initial survey and shall be used for the duration of the monitoring, regardless of condition of the estuary each year. The locations shall be spread within the estuary from the lagoon up to the sill at Yanonali Street.

    c. The qualified biologist shall note the conditions of the substrate in the estuary, such as its depth, relative suitability for spawning and foraging, and any other factors deemed relevant to tidewater goby habitat.

    d. The qualified biologist shall note water conditions in the estuary, including temperature, a subjective estimate of turbidity, level at the sampling locations, and subjective water quality (odor, color, litter).

e. Individuals shall be captured using standard techniques such as beach seining or dip-netting. The specimens shall be released immediately at the point of capture once they have been identified, measured, and their sex determined.

The following terms and conditions implement reasonable and prudent measure 3:

4. Because tidewater gobies are most often on the bottom of the estuary, the intake on the pumps used for water diversion shall be floated as long as possible to prevent tidewater gobies from being entrained and killed.

5. The mesh size on the pump intake shall be 1/8-inch or less. The mesh shall be checked by the qualified biologist prior to use each day and twice daily during operation to determine that it is intact. If the mesh develops holes or other conditions that impair its functioning, it shall be replaced, or repaired immediately.

REPORTING REQUIREMENTS

In addition to the information gathered pursuant to the terms and conditions above, the Corps shall provide an annual report to us on activities conducted during the year related to the project for each calender year the Corps is involved in construction and monitoring operations. The report shall contain a brief discussion of the activities completed in the previous year or planned for the next year; approximate acreage habitat within the estuary affected; occurrences of incidental take, if any; problems encountered in implementing avoidance and minimization measures and terms and conditions; recommendations for modifying the terms and conditions to enhance the protection of the tidewater goby and to simplify compliance with them; and any other pertinent information. The report shall be submitted by January 31 each year. Our office shall be notified in case of a delay. This document would assist our office and the Corps in evaluating future measures for the conservation of the tidewater goby during similar projects.

DISPOSITION OF INJURED OR DEAD SPECIMENS

Within three days of locating any dead or injured tidewater gobies, you must notify the Service's Division of Law Enforcement by facsimile at (310) 328-6399 and our office at (805) 644-1766 (2493 Portola Road, Suite B, Ventura, California 93003) by telephone and in writing. Your report shall include the date, time, location of the carcass, a photograph, cause of death, if known, and any other pertinent information.

Care shall be taken in handling injured animals to prevent additional injury. Injured animals may be released to the wild after receipt of concurrence from our office. Care shall be taken in handling dead specimens to preserve biological material in the best possible state for later analyses. Dead tidewater gobies shall be preserved in 90 or 95 percent ethanol.

The remains of tidewater gobies shall be placed with the Los Angeles County Museum of Natural History, Section of Fishes, 900 Exposition Boulevard, Los Angeles, California, 90007, (213) 763-3374; Marine Vertebrate Collection, Scripps Institute of Oceanography, La Jolla, California, 92093-0208, (619) 534-2199; or any other permitted facility authorized to receive specimens.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs federal agencies to use their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. The Corps should examine ways of ensuring that the proper amount of sediment, of the correct grain size, moves into the estuary to maintain natural conditions for tidewater gobies. The results of annual monitoring of the estuary should assist in determining whether additional sediment is needed. Maintenance schedules or practices could be adjusted to accommodate the need for more sediment, if necessary.

2. Because recolonization of watersheds by tidewater gobies is not well-documented, the Corps should coordinate with tidewater goby experts such as Camm Swift or Kevin Lafferty to determine if a capture-mark-recapture study is viable. If such a study is viable, the Corps should provide funding for a research program to determine if recolonization events are occurring at Mission Creek. Tidewater gobies in Mission Creek and in the nearest estuaries to the south and north of Mission Creek should be marked prior to winter rains and subsequently sought in adjacent drainages.

3. The Corps should work with the City of Santa Barbara to improve the quality of water in Mission Creek, especially in the lagoon. Measures which could be implemented include processing of nuisance runoff through filters to remove trash and oil and grease, locating and eliminating sources of bacterial contamination, and controlling activities adjacent to the estuary.

4. Because the genetic relationship of individual tidewater goby populations is unclear, the Corps could fund research into the genetics of the tidewater goby. This would involve removal of tissue samples from tidewater gobies in numerous estuaries and analysis of their DNA. Such research would either solidify the evolutionary significance of populations in separate estuaries or demonstrate that genetic exchange and colonization is extensive. If genetic research shows that colonization and genetic exchange between populations is limited or non-existent, the conservation of individual populations could be important.

REINITIATION NOTICE

This concludes formal consultation on the Corps' Lower Mission Creek Flood Control Project. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions, please contact Rick Farris of my staff at (805) 644-1766.

Sincerely,

Ann S Bull

For Diane K. Noda
Field Supervisor

Enclosure

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APPENDIX 7

Lower Mission Creek 401 – Permit

California Regional Water Quality Control Board
Central Coast Region

Linda S. Adams
Secretary for Environmental Protection

Internet Address: http://www.waterboards.ca.gov/centralcoast
895 Aerovista Place, Suite 101, San Luis Obispo, California 93401-7906
Phone (805) 549-3147 • FAX (805) 543-0397

Arnold Schwarzenegger
Governor

January 26, 2010

Pat Kelly
City of Santa Barbara
630 Garden Street
Santa Barbara, CA 93109

Dear Pat Kelly:

WATER QUALITY CERTIFICATION NUMBER 34209WQ22 FOR LOWER MISSION CREEK FLOOD CONTROL PROJECT, SANTA BARBARA COUNTY

Thank you for the opportunity to review your August 12, 2009 application for water quality certification of the Lower Mission Creek Flood Control Project. The application was completed on August 17, 2009. The project appears to protect beneficial uses of State waters. We are issuing the enclosed Standard Letter of Certification.

At this time, we do not anticipate issuing additional requirements based on your application. Should new information come to our attention that indicates a water quality problem, we may require additional monitoring and reporting, issue Waste Discharge Requirements, or take other action.

Your Section 401 Water Quality Certification application and CEQA documents indicate that project activities may affect beneficial uses and water quality. The Water Board issues this certification to protect water quality and associated beneficial uses from project activities. We need reports to determine compliance with this certification. All technical and monitoring reports requested in this certification, or anytime after, are required per Section 13267 of the California Water Code.

Your failure to submit reports required by this certification, or your failure to submit a report of technical quality acceptable to the Executive Officer, may subject you to enforcement action per Section 13268 of the California Water Code. The Water Board will base enforcement actions on the date of certification. Any person affected by this Water Board action may petition the State Water Resources Control Board (State Board) to review this action in accordance with California Water Code Section 13320; and Title 23, California Code of Regulations, Sections 2050 and 3867-3869. The State Board, Office of Chief Counsel, PO Box 100, Sacramento, CA 95812, must receive the petition within 30 days of the date of this certification. We will provide upon request copies of the law and regulations applicable to filing petitions.

If you have questions please Phil Hammer at (805) 549-3882. Please mention the above certification number in all future correspondence pertaining to this project.

Sincerely,

for Roger W. Briggs
Executive Officer

Enclosure: Action on Request for CWA Section 401 Water Quality Certification

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cc: Enclosures with

Matthew W. Vandersande
U.S. Army Corps of Engineers
Ventura Office
Regulatory Section
2151 Allesandro Drive, Suite 110
Ventura, CA 93001

U.S. Army Corps of Engineers
San Francisco District
Regulatory Section
1455 Market Street, Floor 16
San Francisco, CA. 94103-1398

Natasha Lohmus
California Department of Fish and Game
Lake and Streambed Alteration
1933 Cliff Drive, Suite 9
Santa Barbara, CA 93109

401 Program Manager
State Water Resources Control Board
Division of Water Quality
Stateboard401@waterboards.ca.gov

R9-WTR8-Mailbox@epa.gov

Action on Request for
Clean Water Act Section 401 Water Quality Certification
for Discharge of Dredged and/or Fill Materials

PROJECT: Lower Mission Creek Flood Control Project
APPLICANT: Pat Kelly
City of Santa Barbara
630 Garden Street
Santa Barbara, CA 93109

ACTION:
1. ■ Order for Standard Certification
2. ☐ Order for Technically-conditioned Certification
3. ☐ Order for Denial of Certification

STANDARD CONDITIONS:

1. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment per section 13330 of the California Water Code and section 3867 of Title 23 of the California Code of Regulations (23 CCR).

2. This certification action is not intended to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed per to 23 CCR subsection 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license was being sought.

3. The validity of any non-denial certification action (Actions 1 and 2) shall be conditioned upon total payment of the fee required under 23 CCR section 3833, unless otherwise stated in writing by the certifying agency.

4. This certification is subject to the acquisition of all local, regional, state, and federal permits and approvals as required by law. Failure to meet any conditions contained herein or any the conditions contained in any other permit or approval issued by the State of California or any subdivision thereof may result in the revocation of this Certification and civil or criminal liability.

5. In the event of a violation or threatened violation of this certification, the violation or threatened violation shall be subject to any remedies, penalties, process or sanctions as provided for under state law. For purposes of Section 401(d) of the Clean Water Act, the applicability of any state law authorizing remedies, penalties,

process or sanctions for the violation or threatened violation constitutes a limitation necessary to assure compliance with the water quality standards and other pertinent requirements incorporated into this certification.

6. In response to a suspected violation of any condition of this certification, the Water Board may require the holder of any permit or license subject to this certification to furnish, under penalty of perjury, any technical or monitoring reports the Water Board deems appropriate, provided that the burden, including costs, of the reports shall have a reasonable relationship to the need for the reports and the benefits obtained from the reports.

7. The total fee for this project is the $9,004 which includes the application fee that was provided. The remaining fee due to the Water Board is $8,634.

REGIONAL WATER QUALITY CONTROL BOARD CONTACT PERSON:

Phil Hammer
Central Coast Region, Region 3
(805) 549-3882
phammer@waterboards.ca.gov
Please refer to the above certification number when corresponding with the Water Board concerning this project.

WATER QUALITY CERTIFICATION:

I hereby issue an order certifying that any discharge from the Lower Mission Creek Flood Control Project shall comply with the applicable provisions of sections 301 ("Effluent Limitations"), 302 ("Water Quality Related Effluent Limitations"), 303 ("Water Quality Standards and Implementation Plans"), 306 ("National Standards of Performance"), and 307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act.

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited and all proposed mitigation being completed in strict compliance with the applicant's project description and the attached Project Information Sheet, and (b) compliance with all applicable requirements of the Regional Water Quality Control Board's Water Quality Control Plan (Basin Plan).

for Roger W. Briggs
Executive Officer
Regional Water Quality Control Board

1/26/10
Date

Attachment 1

PROJECT INFORMATION

Application Date	Received: August 12, 2009 Completed: August 17, 2009
Applicant	City of Santa Barbara, County of Santa Barbara, US Army Corps of Engineers
Applicant Representatives	N/A
Project Name	Lower Mission Creek Flood Control
Water Board Application Number	34209WQ22
Type of Project	Culvert replacement
Project Location	City of Santa Barbara Longitude: 119° 41' N Latitude: 34° 24'
County	Santa Barbara
Receiving Water(s)	Mission Creek, Pacific Ocean 315.32 South Coast Hydrologic Unit
Water Body Type	Creek, ocean
Designated Beneficial Uses	Municipal and Domestic Supply (MUN) Ground Water Recharge (GWR) Water Contact Recreation (REC-1) Non-Contact Recreation (REC-2) Wildlife Habitat (WILD) Cold Fresh Water Habitat (COLD) Warm Fresh Water Habitat (WARM) Migration of Aquatic Organisms (MIGR) Spawning, Reproduction, and/or Early Development (SPWN) Rare, Threatened or Endangered Species (RARE) Estuarine Habitat (EST) Freshwater Replenishment (FRSH) Commercial and Sport Fishing (COMM)
Project Description (purpose/goal)	The purpose of the project is to increase hydraulic capacity of Mission Creek from 1,350 cubic feet per second to 3,400 cubic feet per second. <u>The Central Coast Regional Water Quality Control Board (Water Board) understands that the project includes the following:</u> • A combination of a vertical wall and ungrouted riprap will be installed to the creek banks to maintain the natural bottom. • The bottom half of the bank will consist of a vertical wall

	while the upper half would be built with riprap at a 1.5:1 (H:V) slope. • Aesthetic treatment will be incorporated into the project design to minimize the visual impacts of vertical walls. • The riprap will be covered with topsoil. • Concrete pipes of varying sizes (up to a maximum of three feet in diameter) will be strategically placed in between the riprap to allow planting of native trees and vegetation. • Native willows or branches and other native herbaceous plants will be planted beneath the riprap to sprout through gaps in it and form continuous understory riparian growth. • Future maintenance is an integral part of the project. • The improved creek will generally follow the existing alignment and will incorporate a new culvert between Highway 101 and the Chapala Street Bridge that would carry high flows and bypass the oxbow. The oxbow will be left in place to function as the low flow channel. The culvert will extend between the upper end of the oxbow and the Chapala Street Bridge, roughly 830 feet long. The culvert and the existing watercourse will reunite immediately below that bridge.
Preliminary Water Quality Issues	The Water Board finds the project has the potential to cause sedimentation, siltation, and pollutant release to the creek/wetland. Erosion could be caused by the construction activities or by the new culvert installation project. Pollutants could be released from construction equipment (e.g., oil, gasoline, hydraulic fluid, and other liquid contaminants associated with earth-moving equipment) or from the concrete work associated with installation of the bottomless arch culvert. The Water Board finds the project has the potential to adversely impact tidewater goby and steelhead and their habitat.
Water Board Mitigation Requirements	<u>Mitigations proposed by City of Santa Barbara that are required to comply with 401 Water Quality Certification are as follows:</u> • Construction within the creek must take place during the dry season, beginning no earlier than May 15 and ending no later than October 15. • City of Santa Barbara must use silt fences and/or straw wattles around construction areas to control and eliminate

	erosion and sedimentation. • Erosion control measures shall be applied to all disturbed earth surfaces. • Seeding of entire slope with an approved grass seed mixture and placement of erosion control blankets over seeded areas shall be implemented for slope stabilization. • Any material stockpiled during construction shall be covered with plastic. • All construction vehicles and equipment used on site must be well maintained and checked daily for fuel and hydraulic fluid leaks or other problems that could result in spills of toxic materials. • The contractor must be required to have oil absorbent pads onsite in case a spill occurs. • City of Santa Barbara must designate a staging area for equipment/vehicle fueling and storage at least 100 feet away from waterways, in a location where fluid will not flow into waterways. • All vehicle fueling must occur at least 100 feet away from waterways, and in the designated staging area. • Stream diversion dams shall be constructed of sand bags wrapped in heavy plastic sheeting. • Sand bags shall be filled with clean gravel. • Water Board staff must be notified if mitigations as described in the 401 Water Quality Certification application for this project are altered by the imposition of subsequent permit conditions by any local, state or federal regulatory authority. City of Santa Barbara must inform Water Board staff of any modifications that interfere with compliance with this certification.
Area of Disturbance	Approximately 3.17 acres Streambed: 2.48 acres temporary Ocean/Bay/Estuary: 0.69 acres temporary
Fill/Excavation Area	N/A
Dredge Volume	Approximately 82,000 cubic yards
U.S. Army Corps of Engineers Permit No	Individual Permit
Federal Public Notice	Usually not applicable unless a notice was sent in the mail.
Dept. of Fish and Game Streambed Alteration Agreement	Streambed Alteration Agreement is pending. Final, signed copy will be forwarded immediately upon execution.
Possible Listed Species	Tidewater goby (Eucyclogobius newberryi) and steelhead (Oncorhynchus mykiss)

Status of CEQA Compliance	EIR, (Mitigated) Negative Declaration, Categorical Exemption
Water Board Compensatory Mitigation Requirements	The project will include the following: • Onsite mitigation shall be the first priority. City of Santa Barbara shall contact the Water Board if a suitable restoration site cannot be located onsite for habitat impacts.
Total Certification Fee	$9,004
Application Fee Provided	$ 640
Remaining Project Fee Due	$8,364
Additional Conditions	Contact Water Board staff when project begins to allow for a site visit. Submit a signed copy of the Department of Fish and Game's streambed alteration agreement to the Water Board immediately upon execution and prior to any discharge to waters of the State. The Water Board requires visual monitoring and three reports for this project: • Visually inspect the site (at least one reach upstream and downstream of project) after completion of the project and for two subsequent rainy seasons to ensure that the new structures are not causing excessive erosion or other water quality problems. If the project does cause water quality problems, contact the Water Board staff member overseeing the project. You will be responsible for obtaining any additional permits necessary for implementing plans for restoration to prevent further water quality problems. • First Report: Within 30 days of project completion, submit a project completion report that contains a summary of daily activities, monitoring observations, and problems incurred and actions taken; include properly identified post-project photos. • Second and Third Report: Submit annual reports complete with photos of revegetation efforts by December 31 of each monitoring year. Annual reports must quantify growth and progress of restoration and determine to what extent performance criteria have been met. All areas of the revegetation site shall be assessed for percent cover, general health and stature, and signs of reproduction. The report shall also include photographs of revegetation

	progress over time.

APPENDIX 8

NOAA Steelhead BO

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE

Southwest Region
501 West Ocean Boulevard, Suite 4200
Long Beach, California 90802-4213

AUG 2 2000

In Your Response
Please Refer to:

F-LB-00-23:KAJ

Robert E. Koplin
Department of the Army
Los Angeles District, Corps of Engineers
P.O. Box 532711
Los Angeles, California 90053-2325

Dear Mr. Koplin:

This document transmits the National Marine Fisheries Service's (NMFS) biological opinion based on NMFS' review of the Army Corps of Engineers' (ACOE) project to construct and the County of Santa Barbara (County) project to maintain a flood control channel on lower Mission Creek in the City of Santa Barbara, Santa Barbara County, California, and their effects on the Federally endangered Southern California Evolutionarily Significant Unit (ESU) of steelhead (*Oncorhynchus mykiss*) and its critical habitat in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Formal consultation for the Mission Creek flood control project was initiated on June 20, 2000.

The NMFS contact for this project is Korie Johnson. Please contact her at (562) 980-4199, if you have any questions regarding this consultation.

Sincerely,

Rodney R. McInnis
Acting Regional Administrator

BIOLOGICAL OPINION

AGENCY: United States Army Corps of Engineers

ACTION: Construction and maintenance of flood control channel on lower Mission Creek, Santa Barbara County, California

CONSULTATION CONDUCTED BY: National Marine Fisheries Service, Southwest Region

DATE ISSUED: AUG 2 2000

I. INTRODUCTION

Lower Mission Creek and its associated floodplain is highly constrained by residential and commercial development. Thus, streamflow often overtops the creek embankments during heavy storms, resulting in extensive flooding. The City has experienced approximately 20 damaging floods since 1900. In 1995, flooding resulted in extensive damage to City and private property, numerous evacuations of residents living within the immediate floodplain of Mission Creek, and transportation delays. Due to the recurrent flooding, the City of Santa Barbara (City) and the Santa Barbara County Flood Control District (County) requested that the Army Corps of Engineers (ACOE) assist the City in finding a solution to the flooding problems. In response to this request, ACOE has proposed the construction and maintenance of a flood control channel along the lower 1.2 miles of Mission Creek in the City of Santa Barbara, Santa Barbara County, California.

During early planning stages of this project, NMFS staff attended multiple site visits and agency coordination meetings. During these early meetings, NMFS informed the ACOE of steelhead concerns regarding the proposed project. On December 21, 1999, NMFS received a feasibility report for the ACOE's project along with a request for formal consultation. At that time, however, completed descriptions of construction and maintenance activities were not available. Thus, NMFS requested further project information, including detailed project plans, proposed maintenance activities, hydraulic analyses, cross sections and profiles of the project reach, and an analysis of possible effects to steelhead. At a June 7, 2000 meeting, ACOE presented the requested information and asked for further input from NMFS. On June 20, 2000, the final Biological Assessment, project description and hydraulic analyses were received by NMFS and formal consultation on endangered steelhead and steelhead critical habitat was initiated in accordance with section 7 of the Endangered Species Act (ESA).

This biological opinion, therefore, represents formal consultation for the Southern California ESU for the Federally endangered steelhead and for designated steelhead critical habitat. A complete administrative record is on file at NMFS

Southwest Region Office (501 W. Ocean Blvd., Suite 4200, Long Beach, CA 90802-4213).

II. Description of the Proposed Action

Introduction

The Federal action involves the Army Corps of Engineers (ACOE) constructing a flood control channel along 5380 linear feet (ft) of lower Mission Creek beginning at the Canon Perdido Street Bridge and continuing downstream to the Cabrillo Boulevard Bridge within the estuary (Figure 1). The purpose of the project is to increase the capacity of lower Mission Creek from 1050 cubic feet per second (cfs) to 3,400 cfs in order to provide flood protection up to a 20-year storm event. Once the project is constructed, the County would be responsible for maintaining the channel at the design capacity.

Action Area

The action area for the ACOE lower Mission Creek flood control project includes approximately 5500 linear feet of Mission Creek, including the channel invert and both embankments from Canon Perdido Street down to Cabrillo Boulevard near the mouth. Mission Creek is part of the Southern California Evolutionarily Significant Unit (ESU) for the Federally endangered steelhead (*Onchorynchus mykiss*) and was designated by NMFS as steelhead critical habitat on February 16, 2000.

Proposed Action

Overview

Generally, the ACOE project involves widening the channel, lining the embankments with vertical concrete walls, streamlining the bedslope, installing a bypass culvert near the Highway 101 crossing (referred to as the oxbow), and replacing four bridges (Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridges) in order to accommodate increased channel capacity (Figure 1). Five properties along the creek channel will be purchased by the ACOE, and existing buildings on those properties will be removed for the widening of the creek. The remainder of the parcels would be used in the creation of isolated park areas, referred to as habitat expansion zones. The parcels range in size from 0.03 to 0.52 acres. Native trees, including western sycamores, cottonwoods, and coast live oak will be planted in these parks and along creek embankments to provide an expanded riparian corridor.

In order to widen and stabilize the channel, ACOE will remove existing bank stabilization structures, excavate embankments, and install hard bank slope protection. A total of 82,000 cubic yards of material will be excavated from the

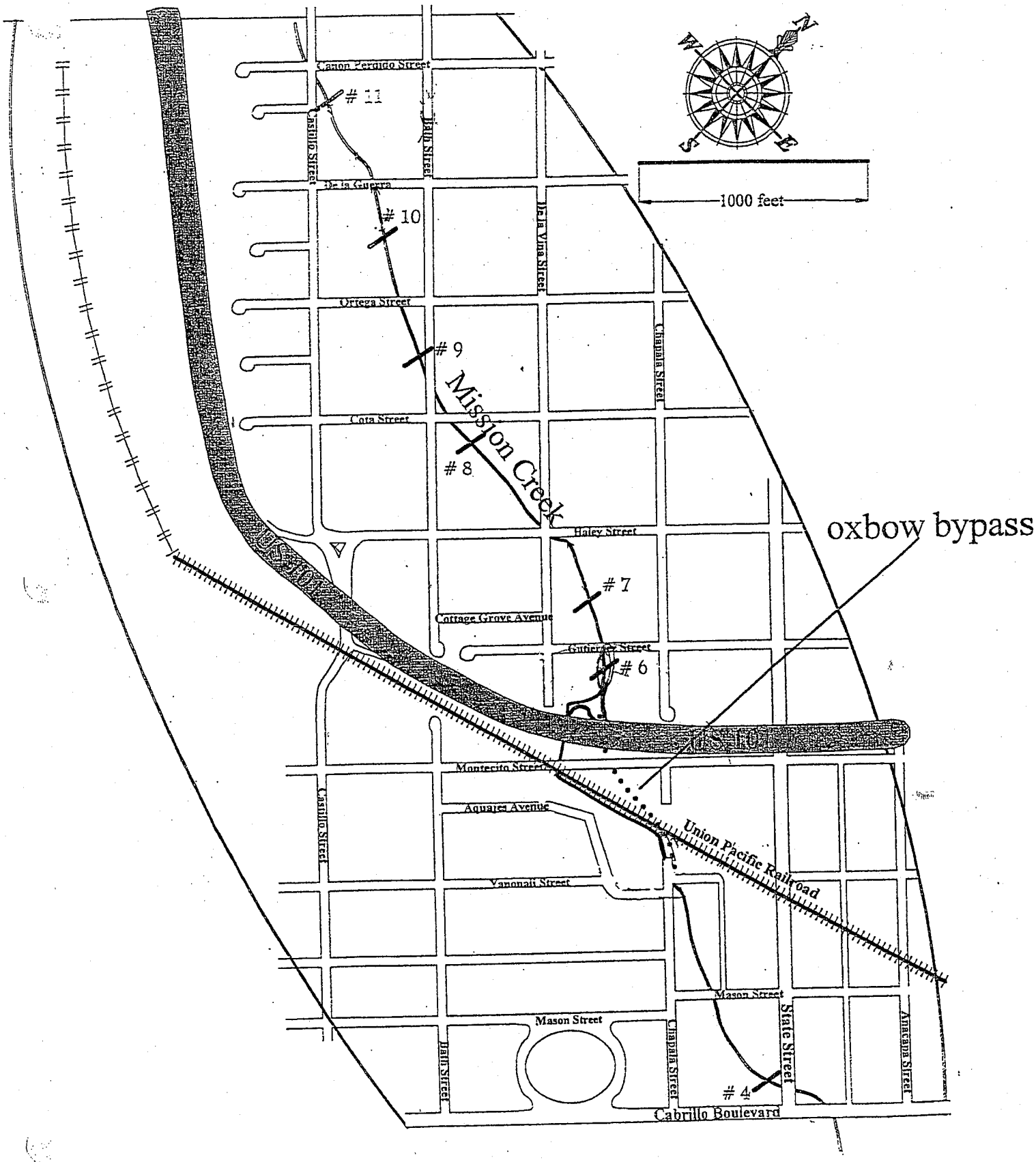

Figure 1. Project area for Army Corps of Engineers Flood Control Project along lower Mission Creek in the City of Santa Barbara, Santa Barbara County, California. Numbered lines indicate locations of representative cross sections used in hydraulic analyses.

creek channel and embankments. Only the retaining wall located on the eastern bank upstream of the De la Guerra Bridge and the hard bottom channel and mortared sandstone walls (approximately 940 linear ft) located between the upstream side of Highway 101 and the downstream side of Chapala Street, referred to as the "oxbow," will be left in place. Approximately 420 linear ft of existing cement channel located between Haley and De la Vina Street bridges will be removed.

Hard bank slope protection will consist of either complete vertical cement walls or combination vertical toe wall and vegetated riprap sideslope (Table 1). Walls will be constructed in one of two methods, depending on their proximity to existing structures. An inverted "T" footing would be applied in areas where sufficient rights-of-way are available. In areas with limited rights-of-way, a pier footing construction would be used. In general, the toe wall height will be half the depth of the channel. The remaining top half of the bank will be the riprap side slope. Between successive bridges the toe walls will be of constant height and therefore the height of the riprap slope could vary somewhat. The side slope will be constructed by backfilling the vertical wall with riprap at a maximum slope of 1.5:1. The riprap will be covered with topsoil and planted to establish a healthy riparian corridor. Short cylinders will be placed in between the riprap to allow planting of native trees and vegetation. Following project implementation a total of 2395 linear feet will be vertical wall and 4490 linear feet will be vertical wall-riprap sideslope.

Table 1. Overview of modifications to lower Mission Creek channel and embankments.

Reach	Upstream Extent	Proposed Treatment Left Bank	Proposed Treatment Right Bank	Proposed average depth	Proposed width (channel invert)	In-Channel Modifications
1	Canon Perdido	Wall/riprap Vertical wall	Wall/riprap Vertical wall	7.5	42	Boulder cluster, fish baffles & ledges
2	De la Guerra	Wall/riprap Vertical wall	Wall/riprap	9	42	Boulder cluster, fish baffles & ledges
3	Ortega	Wall/riprap	Wall/riprap	9	42	fish baffles
4	Bath	Vertical wall	Access ramp	9	42	fish baffles & ledges
5	Cota	Wall/riprap Vertical wall	Wall/riprap Vertical wall	9	42	
6	Haley-De la Vina	Wall/riprap Vertical wall	Wall/riprap	9	50	Boulder cluster, fish baffles & ledges
7	Gutierrez	Wall/riprap Culvert inlet	Wall/riprap Riprap	9	50	Boulder cluster
8	Highway 101	Bypass culvert Oxbow	Bypass culvert Oxbow		33-40 (no change)	Boulder cluster
9	Chapala/ Yanonali	Wall/riprap Vertical wall	Vertical wall	7.5	60	fish baffles & ledges

10	Mason	Wall/riprap Vertical wall	Vertical wall	8	60	fish baffles, vertical ridges, ledges
11	State to Cabrillo	Wall/riprap	Wall/riprap	9	60	fish baffles, vertical ridges

An overflow box culvert will be installed at the oxbow. During this stretch, the creek makes several sharp turns as it crosses Highway 101, the Montecito Street Bridge, and Union Pacific Railroad. The culvert will have two 15 ft wide by 6 ft high boxes and will follow a direct path between the Gutierrez and Chapala Street Bridges. A weir structure will be built at the inlet of the culvert to direct all flows up to 640 cfs through the oxbow channel. If flows increase above 640 cfs, the weir will split flows between the overflow culvert and the oxbow channel. At a design flow of 3400 cfs, 2350 cfs will be directed through the culvert and 1050 cfs will flow through the oxbow. The weir will be approximately 3 ft higher than the channel invert and will be 240 ft in length, extending about 22 ft laterally into the channel.

Fish habitat

ACOE has incorporated a number of measures into the design of the flood control channel to provide cover and resting areas for steelhead. In order to dissipate high velocities and allow for improved migration of steelhead, the creek channel will be lined with riprap (up to 15 inches in diameter) at three locations. At two locations, clusters of 6 to 9 large boulders will be keyed into the riprap within the channel to break up the principal currents. Boulders will be 3 to 4 ft in diameter and placed 5 to 8 ft apart. Individual boulder fields will be 300 ft in length. One will be centered at the De la Guerra Street Bridge (starting150 feet upstream and running 150 feet below the bridge). The second would be located from 150 feet upstream of the Gutierrez Street Bridge downstream to the start of the oxbow. The outlet of the overflow culvert will be armored with riprap to prevent scouring of the streambed, but will not have boulder clusters.

ACOE will also incorporate structures into the vertical concrete walls to provide cover, shade and resting areas for steelhead. Between Mason Street and Cabrillo Boulevard, molded ridges extending vertically along the wall will lower water velocity and create localized eddy currents, providing refuge for small fish. These ridges will mostly benefit gobies, but could provide cover for young-of-the-year steelhead as well. Ridges will begin at the bottom of the formed wall and continue vertically to the ordinary high water mark, a height of approximately 8 ft at the estuary. They will vary in length from 1 to 4 feet, and will be 6 inches wide and extend 3 inches out from the wall. The space between successive ridges will be 12 inches.

In addition, artificial overhangs will be cantilevered from the wall extending 2 ft into the channel. The ledges will be 6 inches thick and approximately 50 ft long.

Within the estuary, ledges will be built approximately 10-20 inches above the invert of the stream so that water will cover the ledges at all times except at the lowest low tides. Double rows of coarse boulders (baffles) will be keyed into the channel between the overhangs along the creek walls. Spaces in between the rocks will provide additional cover and heterogeneity to the channel invert. These boulder side baffles will extend 5 ft into the channel and project 18 to 24 inches above the creek invert. A space of approximately 5 ft to 8 ft will be left between pairs of rocks to facilitate periodic removal of sediment.

The combination of all three of the above features will be incorporated into the channel and channel walls within the estuary between Mason and Cabrillo bridges. In this estuarine section of the creek, boulders would be packed together as tightly as possible. Features will be offset, so that ledges on one bank of the creek face ridges and boulders on the opposite bank of the creek. This will result in a total of 380 linear ft of fish ridges and boulders, and 240 linear feet of over hanging ledges on the eastern bank of the creek, and 360 linear feet of ridges and boulders, and 300 linear ft of ledges on the western bank of the creek.

Upstream of the Mason Street Bridge, overhangs will be placed at locations where currents are expected to impinge against the wall and scour persistent pools under the ledges. Four ledges will be built along the eastern bank for a total of 200 linear ft. Five ledges will be built along the western bank for a total of 250 linear ft. Ten rock baffles will be constructed in lower velocity sections of the creek, with individual baffles extending from 150 to 200 ft in length. A total of approximately 1400 linear ft of rock baffles will be installed; 675 linear ft on the east bank and 725 linear ft along the right side.

Construction

Prior to any construction activities within a given project reach, a qualified biologist shall survey for the presence of steelhead. If steelhead are present, a qualified biologist shall net and relocate them to suitable habitat within Mission Creek. Methods for steelhead capture and relocation are discussed below.

Construction activities shall begin at the downstream extent of the project area and progress upstream. Project construction is expected to last 3 years, although delays due to weather or mechanical failure could prolong the project for an additional 1 to 2 years. For construction within the estuary from Cabrillo Boulevard up to Yanonali Street, all construction within the creek will occur between June 1 and December 1 of any given year. Upstream of the estuary work could begin as early as April 15, but only if Mission Creek does **not** have continuous surface flow between Oak Park and the upper extent of the project area. If surface flow persists, construction will only occur after June 1. Only one side of the channel will be isolated and dewatered at any given time to allow normal tidal flushing and unimpeded stream flows within the other half.

In order to dewater the work area within the estuary, a temporary barrier will be installed down the centerline of the proposed channel (not the existing centerline) by driving sheet piles. Pile driving equipment working from the top of the eastern bank will drive the sheet piles near the existing east bank. Barriers will then be installed at the upper and then the lower end of the proposed centerline to create an enclosure on one side (on the east side first) of the creek. The enclosure will be seined by qualified biologists to remove any fish trapped within the area. Once all fish are removed, pumps fitted with ½ inch mesh screens will be used to pump water out of the enclosure. Biologists will continue to monitor the enclosure while water is pumped out in order to rescue any fish that were missed during the initial seining. Construction activities, including excavation and wall construction will then be completed within the dewatered area. The ACOE will complete construction along one side of the estuary, between Cabrillo Boulevard and Yanonali Street, in a single segment, thus avoiding the complications of repetitive de-watering processes in multiple short segments of the estuary. Once construction is completed within the dewatered work area, the downstream and upstream barriers will be removed and installed on the opposite side of the channel. The new enclosure will be surveyed and dewatered as described above, and construction within the newly dewatered area will be completed.

Prior to construction upstream of the estuary stream flow will be diverted through 2 culverts set into a temporary pilot channel that will be dug into the channel invert. The combined capacity of the two culverts will be at least 40 cfs. Culverts will be smooth along their inner walls and at transitions between segments. Following construction, the streambed will be shaped according to design elevation and slope. A lowflow channel will be constructed through the project area and the channel invert will be restored using substrate representative of natural conditions (type and size) in lower Mission Creek. Following restoration of the channel invert, the diversion will be removed. This sequence of activities will continue upstream until the project is finished.

Revegetation

Of the 7310 linear feet of stream bank within the project area (excluding bridges and the 940 ft length of the oxbow) , 2100 linear feet (29%) have natural soft surfaces, while the remaining 5210 linear feet (71%) have some form of revetment. Vegetation grows along all of the embankments with soft surfaces and through cracks within the hard surfaces. The vegetation present is dominated by invasive non-native species, such as giant reed (*Arundo donax*). As much as is practicable, large native trees that are present will be avoided and saved. When finished, the combination toe-wall and riprap slope would occupy 4740 linear feet (65%) while full-height vertical walls would remain along 2510 linear feet (35%) of the stabilized banks. Following construction the riprap sideslopes and habitat expansion areas will be replanted with native vegetation. A minimum of 120 trees will be planted on the sideslopes and a minimum of 330

trees will be planted in the habitat expansion areas. Exact tree species have not been determined but will include western sycamore, Fremont's cottonwood, black cottonwood, coast live oak, white alder, California bay, Arroyo willow, wax myrtle, Mexican elderberry, squaw bush, and blackberry. In addition, sideslopes and habitat expansion areas will be revegetated with native shrubs and grasses by hydroseeding. A temporary, above ground irrigation system will be installed to irrigate planted vegetation for at least 3 years. Any dead or dying trees and shrubs shall be replaced immediately (except during midsummer). Non-native vegetation will be controlled, by brushing or herbicide, and/or removed.

In order to insure success of revegetation efforts, the ACOE has developed a detailed vegetation monitoring plan. Riparian corridors will be monitored every 3 months during the first year following construction, every 4 months during the second year, and every 6 months during the third, fourth and fifth year. Following the fifth year, the County will incorporate all monitoring and maintenance activities into their annual streambed maintenance activities. Growth rates of trees and shrubs will be documented for 5 years. If plants do not meet pre-determined growth rates, growing conditions will be improved using fertilization or increased irrigation. Success of revegetation will be defined by the following:

1. A minimum of 90% survival of planted vegetation after five years.
2. A minimum of 40% survival of shrubs after five years. All shrubs should attain at least 50% the height and breadth typical of each in this climate.
3. A minimum of 50% of the riparian corridor should be occupied by willows, 7 to 10 ft in height, after five years.

Maintenance

The County will be responsible for maintaining the project reach at its design function and form. All maintenance activities will be accomplished between August 1 and October 31 of any given year. Maintenance activities could include sediment and vegetation removal, repair of concrete walls, culvert, riprap, side baffles, and boulder fields, and upkeep of the riparian corridor. All maintenance activities will be documented in the County's Annual Maintenance Plan.

Sediment and vegetation will be cleared in any areas where the design capacity of the creek is lowered by 15% or more. Prior to any maintenance activities a qualified biologist will survey project areas and relocate any steelhead found there to suitable habitat within Mission Creek. Methods for steelhead capture and relocation are discussed below. Sediment will be removed using a loader or road grader working from within the channel. Vegetation will be removed by brushing, clearing, or spraying. Removal will be completed in a mosaic pattern so that only one side of the creek shall be cleared during any given year. To achieve the mosaic pattern, a swath, half the width of the channel, will be cleared along one side of the creek for a distance of approximately 100-200 ft. Activities within the 100-200 ft downstream of this swath will then be confined to the

opposite half of the creek. This pattern will continue downstream until maintenance activities are completed. The areas of the creek that are not excavated or cleared would be mowed to suppress woody vegetation, while allowing herbaceous vegetation to grow.

Following any clearing activities, a low flow channel will be constructed or re-established so that streamflow passes close to areas where cover and shading are available throughout the dry season. Removal of sediment and/or mowing of vegetation would likely occur once every 3 years, depending on climatic conditions. However, a sequence of large storm could necessitate maintenance activities to be performed as often as once a year. Areas of clearing will be reversed between years so that no one area is excavated or completely cleared two years in a row unless necessary to remove sediments deposited by unexpectedly large storm events in order to restore design capacity.

Sediment will also be removed from among boulder clusters and side baffles as needed to prevent them from being buried. Any woody vegetation, such as giant reed or salt cedar, will be removed from within the boulder clusters using hand tools or herbicides. Low growing herbaceous plants will be left in place.

Concrete structures, such as vertical walls, bridge abutments, ledges or culverts, will be inspected annually for cracking, chipping, breaking, sedimentation, uplift or scour. Repair of these structures will occur as needed. If dewatering is necessary to complete repairs, methods described above will be utilized. Any boulders that are displaced by currents will be pushed back into a suitable spot and reset. The County will also inspect and repair vegetated side slopes to maintain the riparian corridor. Riprap and topsoil will be replaced as necessary.

Fish Relocations

Fish relocations will be done in conjunction with, or at the direction of NMFS and/or California Department of Fish & Game (CDFG) using approved techniques. Steelhead will be caught with nets and moved to suitable habitat within Mission Creek and its major tributaries only; no fish will be relocated outside of the creek system. Specific relocation sites will be determined in conjunction with NMFS and CDFG prior to any relocation activities. Relocation will be conducted in a manner that mimics their natural migration patterns. Juvenile fish that appear to be smolting will be moved downstream to suitable habitat while juveniles that appear to be over-summering will be moved upstream to suitable habitat.

Once caught, fish shall be immediately placed in a 5-gallon bucket or 45-gallon ice chest filled with water from the immediate area. Oxygen will be diffused into the container while fish are present. Fish will be immediately transported to the relocation sites and released. Once fish are released, the biologist shall observe the relocated fish, document their behavior for at least one hour, and then return

the following day to make additional observations of the fish presence and behavior.

Upon completion, a report shall be submitted to NMFS documenting all relocation efforts. The report shall include the following information: 1) location of the fish prior to relocation, 2) number of fish relocated, 3) estimated size of fish relocated, 4) general observations of fish condition, 5) time fish was netted, 6) time for transport, 7) relocation site, 8) time of release, and 9) observations made after relocation.

Monitoring

The ACOE shall develop a monitoring plan, to be approved by NMFS, to ensure that flow conditions within the flood control channel match those predicted during pre-project analyses. The plan will include measures to monitor continuous flow conditions and benchmark water depths and velocities. Monitoring will also include observations of how the rock baffles are interacting with the lowflow channel and any opportunistic observations of steelhead migration. If data collected during monitoring indicate that conditions are not suitable for upstream steelhead migration, the ACOE will modify the channel to provide passage.

III. STATUS OF THE SPECIES

INTRODUCTION

Based on the location, timing, and operations of the proposed project, endangered steelhead and designated steelhead critical habitat could be adversely affected by project activities. Adverse impacts could occur due to stream diversion, channel and embankment excavation, vertical wall construction within the creek channel and riparian corridor, and future maintenance of the flood control channel within Mission Creek.

STATUS

Steelhead, the ocean-going form of rainbow trout, are native to Pacific Coast streams from Alaska south to northwestern Mexico (Moyle 1976; National Marine Fisheries Service 1997). Wild steelhead populations in California have decreased from their historic levels (Swift et al. 1993; National Marine Fisheries Service 1997). This decline prompted listing of the Southern California ESU of steelhead as endangered on August 18, 1997 (National Marine Fisheries Service 1997).

The relationship between resident rainbow trout and steelhead trout in most areas is complicated and poorly understood. Although often separated by a natural or man-made barrier to migration, the two forms can interbreed. In addition, resident trout can produce anadromous offspring and vice versa

(National Marine Fisheries Service 1996; Shapovalov and Taft 1954). Anadromous individuals also are capable of residualizing when access to the ocean is blocked, and then returning to anadromy when access is restored. The listing for the Southern California ESU includes all naturally spawned populations of steelhead and their progeny residing below long-term barriers (National Marine Fisheries Service 1997). Adults that have migrated to the ocean usually are larger and more silvery than adult resident trout due to changes in diet and physiological characteristics necessary for ocean survival (Shapovalov and Taft 1954). It is difficult, however, to distinguish juvenile rainbow trout from juvenile steelhead trout without genetic analyses.

The Southern California ESU extends from the Santa Maria River in Santa Barbara County to Malibu Creek in Los Angeles County (inclusive). In the Southern California ESU, there are four major rivers: Malibu Creek and the Santa Clara, Santa Ynez, and Ventura Rivers, and numerous creek drainages that provide important habitat for steelhead. Historically, steelhead probably utilized many coastal streams and rivers in Southern California. For example, historical records document steelhead utilization of the Santa Maria and Santa Ynez Rivers and their major tributaries, and Gaviota, Arroyo Hondo, Venadito, Las Flores Canyon, El Capitan, Corral, Refugio, Atascadero, Mission, Montecito, Carpinteria, and Rincon Creeks (Henke 1998; Swift et al. 1993, Titus et al. in press) the Ventura River, Santa Clara River, Big Sycamore Canyon Creek, Malibu Creek and Topanga Canyon Creek (Busby et al. 1996; Swift et al. 1993).

General causes for the decline of steelhead abundance throughout Southern California include destruction and modification of habitat, point and non-point source water pollution, water withdrawals and diversions, dam operation and maintenance, over-utilization of habitat for recreational purposes, recreational harvest, and natural factors (National Marine Fisheries Service 1997). Even in less urbanized areas, agricultural land-use has led to decreased water quality, reduced vegetation and increased erosion and sedimentation.

In addition, access to many waterways, including critical spawning and rearing habitat, is constrained by manmade barriers (e.g., dams, culverts, road crossing structures, flood control structures, and channelization) and seasonal fluctuations in hydrological conditions. Complete barriers block the use of the upper watershed, often the most productive spawning and rearing habitat in the system. Temporal barriers block passage during certain flow conditions and delay migration. Salmonids generally expend 80% of their stored energy during normal upstream migration to spawning areas (Lauman 1976). Any additional delays can force these fish to use up limited energy reserves, which can significantly impair spawning success. Partial barriers block smaller or weaker fish of a population, limiting the number of fish able to reach spawning grounds. Thus, man-made structures that act as barriers to steelhead passage can have significant impacts on production.

Estimates of run sizes for the major rivers in the Southern California ESU are as follows: Santa Ynez River, <100; Ventura River, <200; Santa Clara River, <100; Malibu Creek, <100 (Busby et al. 1996). These run estimates are not based on survey data and cannot be used to quantitatively assess population abundance throughout the entire Southern California ESU. Although abundance estimates are limited, surveys document the continued existence of steelhead within the Santa Ynez River and some of its tributaries (Busby et al. 1996), Arroyo Hondo Creek (Busby et al. 1996), Gaviota Creek (Reavis 1991; Virginia Gardner, CA State Parks Dept., pers. comm., 1998), Maria Ygnacio Creek (M. Cardenas, CDFG, pers. comm., 1999), Mission Creek (CDFG 1996), Montecito Creek (K. Johnson, NMFS, pers. obs., 1999), San Ysidro Creek (K. Johnson, NMFS, pers. obs., 1999), Carpenteria Creek (CDFG 1996), Ventura River (Reavis 1991), Santa Clara River (Reavis 1991; Nehlsen et al. 1991; CDFG 1996), and Malibu Creek (Reavis 1991; Nehlsen et al. 1991). Information from these surveys indicate, however, that Southern California steelhead numbers are very low and that the population is in danger of extinction.

LIFE HISTORY AND HABITAT REQUIREMENTS

The major life history stages of steelhead involve freshwater rearing and emigration of juveniles, upstream migration of adults, spawning, and incubation of embryos (Shapovalov and Taft 1954; Moyle 1976; Cederholm and Martin 1983; Barnhart 1991; Meehan and Bjornn 1991; Busby et al. 1996; National Marine Fisheries Service 1997). Steelhead young rear in freshwater for one to three years before migrating to the ocean, usually in the spring, where they may remain for up to four years. Steelhead grow and reach maturity at age two to four while in the ocean. The majority of adults immigrate to natal streams for spawning, however some individuals stray to streams other than their natal one (Quinn 1993). This straying serves as one mechanism for dispersal and colonization of new or historical habitats or streams (Wood 1995). Most adults immigrate to freshwater during October to March. Adults may migrate several miles, hundreds of miles in some watersheds, to reach their spawning grounds. Although spawning may occur during December to June, the specific timing of spawning may vary a month or more among streams within a region. Steelhead do not necessarily die after spawning and may return to the ocean, sometimes repeating their spawning migration one or more years.

When spawning, female steelhead dig a nest in the stream and then deposit their eggs. After fertilization by the male, the female covers the nest with a layer of gravel; the eggs incubate within the gravel pocket. Hatching time varies from about three weeks to two months depending on water temperature. The young fish emerge from the nest about two to six weeks after hatching.

Habitat requirements of steelhead in streams generally depend on the life history stage (Cederholm and Martin 1983; Bjornn and Reiser 1991). Streamflow volume, water temperature, and water chemistry must be appropriate for adult

immigration and juvenile emigration (specific habitat requirement data can be found in Bjornn and Reiser 1991). Low streamflow, high water temperature, physical barriers, low dissolved oxygen, and high turbidity can delay or halt upstream migration of adults and timing of spawning, and downstream migration of juveniles and subsequent entry into estuary, lagoon, or ocean habitats. Suitable water depth and velocity, and substrate composition are the primary requirements for spawning, but water temperature and turbidity are also important. Dissolved oxygen concentration, pH, and water temperature are factors affecting survival of incubating embryos. Fine sediment, sand and smaller particles can fill interstitial spaces between substrate particles, thereby reducing water-flow through and dissolved oxygen levels within a nest. Juvenile steelhead require living space (different combinations of water depth and velocity), shelter from predators and harsh environmental conditions, food resources, and suitable water quality and quantity, for ontogeny and survival during summer and winter. Young-of-the-year and yearling steelhead generally use riffles and runs (e.g., Roper et al. 1994) during much of a given year where these habitats exist. Young-of-the-year and older juveniles may seek cover and cool water in pools during the summer (Nielsen et al. 1994).

The information used to describe steelhead life history is largely based on northern populations. Specific data on the life history of southern steelhead are lacking and northern populations provide a general description of steelhead life history and habitat requirements. There are some differences between the two populations. For example, annual rainfall and stream flow is considerably lower and more variable in Southern California than in regions to the north (Moore 1980; Titus et al. in press). Southern California steelhead are often subject to higher water temperatures, increased duration of sand berms across the mouths of streams and rivers, and complete dewatering of some reaches of these streams. These factors influence the migration and life history of Southern California steelhead, and could result in differences between the life history of southern and northern populations. At this time, however, data to support or describe these differences is unavailable. Therefore, NMFS will consider the life history aspects of northern and southern populations comparable for the purpose of this biological opinion.

CRITICAL HABITAT

Critical habitat for the Southern California Evolutionarily Significant Unit for the Federally endangered steelhead, published on February 16, 2000 (50 CFR 226; NMFS 2000), includes all freshwater and estuarine areas, including adjacent riparian zones, accessible to listed steelhead in coastal river basins from the Santa Maria River to Malibu Creek (inclusive). Freshwater critical habitat includes all waterways and substrates below longstanding, naturally impassable barriers (i.e., natural waterfalls in existence for at least several hundred years). Essential features of steelhead critical habitat include adequate substrate, water quality, water temperature, water velocity, cover/shelter, flood, riparian

vegetation, space, and safe passage conditions. Excluded from designated critical habitat are former anadromous areas above the following dams: Vaquero Dam on the Cuyama River; Bradbury Dam on the Santa Ynez River; Casitas Dam and Robles Diversion on the Ventura River; Santa Felicia Dam on Santa Clara River; and Rindge Dam on Santa Monica Bay.

IV. Environmental Baseline

Watershed Overview

Mission Creek flows from the south side of the Santa Ynez Mountains through the City of Santa Barbara where it meets the Pacific Ocean. The creek and its main tributary, Rattlesnake Creek, drain approximately 11.4 square miles. Average gradients in the foothill area are about 1000 ft per mile in contrast to the gradients of 150 ft per mile in the lower reaches of the creek. Other than informal surveys, comprehensive data on steelhead abundance in Mission Creek are unavailable.

Mission Creek can be divided into two sections: the upper watershed within the Santa Ynez Mountains and foothills, and the lower section beginning at the foothills and extending down through downtown Santa Barbara to the ocean. A reasonable location marking the transition between these two areas is the Santa Barbara Mission located 4 miles upstream from the Pacific Ocean. Upper Mission Creek consists of mostly natural habitat with extensive riffle-pool complexes and healthy, developed riparian vegetation dominated by western sycamore, cottonwood, coast live oak, and willow trees. This area of the Mission Creek watershed contains the majority of suitable steelhead spawning and rearing habitat within the system. Although no systematic surveys have been completed, trout have been observed repeatedly upstream from the Mission on both Mission and Rattlesnake Creeks. In June 1999, NMFS biologists walked portions of these areas and observed 4 to 5 trout near the Natural History Museum, 9 large and numerous small trout on Rattlesnake Creek, and tens to hundreds of 1 to 4 inch young-of-the-year (YOY) throughout lower Rattlesnake Creek. Two adults and several YOY were observed at a large scour pool at base of Foothill Bridge and Los Olivos Bridge. These two bridges have concrete aprons that could act as partial impediments to steelhead migration. Trout were observed again in the above areas in July 2000.

Barriers on both Mission and Rattlesnake Creeks block steelhead passage to the highest extent of the watershed. The Botanical Gardens on Mission Creek, located approximately 1 mile upstream of the confluence with Rattlesnake Creek, has an historical dam with aquaduct that stands over 15-20 ft tall. This structure is a complete barrier to steelhead upstream migration. Approximately 2000 ft upstream of this dam is a County owned debris basin that was built in 1964 following the Coyote Fire. This debris basin has a dam associated with it that is a total barrier to steelhead migration. On Rattlesnake Creek, approximately 1.6

miles upstream with the confluence with Mission Creek, there is another debris basin that was also built in 1964 after the Coyote Fire. Again, this basin has an associated dam that impedes migration of steelhead. CDFG biologists have observed trout upstream of these barriers. It is possible that these trout are descendants of residualized steelhead that would demonstrate anadromy if access to the ocean were restored. It is also possible that these trout, whether descendants of resident or steelhead trout, are producing anadromous offspring that are either residualizing above the barriers, or successfully migrating downstream through the various barriers during optimal flow regimes.

Natural habitat persists into lower Mission Creek, but this reach is highly confined due to residential and commercial development. Two reaches within this area have been lined with concrete: a 0.3 mile section and 0.8 mile section both built by the California Department of Transportation in conjunction with the Highway 101 Freeway. Under high flow conditions, velocities increase within these channels and can result in passage impediments. At low flow conditions, streamflow spreads out into a thin layer across the smooth, flat channel. These shallow depths can also act as impediments to steelhead migration. Although good habitat is more limited in lower Mission Creek, steelhead have been observed in some areas. In spring 2000, a CDFG biologist estimated approximately 100-200 trout (6-8 inches in length) in large pools in Oak Park, located approximately 2.6 miles upstream from the ocean.

Flow characteristics are highly variable in Mission Creek and are reflective of the variability in rainfall. Average total annual rainfall between October 1983 and May 2000 in Santa Barbara County is 19.94 inches. The majority of rainfall occurs in December, January, February and March, but is still unpredictable and sporadic between years. Within the above time period total monthly rainfall between December and March ranged from 0 to 20.86 inches per month. Because of the unpredictable timing and magnitude of rainfall, and thus streamflow, flow conditions that allow for steelhead migration can be limited. Suitable rearing habitat is also limited by streamflow in Mission Creek as large sections of lower Mission Creek go dry during summer and fall of most years. It is unknown whether the juveniles observed within and downstream of the project site are migratory steelhead or resident trout, but because they were found in a coastal stream with downstream access to the ocean, they are assumed to be steelhead by NMFS.

Factors Affecting Species in Action Area

The action area begins just downstream of the longer Caltrans channel at Canon Perdido Street. Within the action area, Mission Creek parallels Highway 101 and then turns to the west in an area known as the oxbow. This section of Mission Creek has been altered extensively by manmade structures. Starting at the oxbow, Mission Creek flows through a 140 ft long box culvert (Highway 101), a 60 ft section lined by riprap and wing walls, a 60 ft wide box culvert (Montecito

Street), a 20 ft section lined with wing walls, a 70 ft section beneath the Union Pacific Railroad tracks and then through a 530 ft section lined with historic sandstone. A 15 inch high sill exists at the downstream end of the sandstone lining (Yanonali Street). This location marks the change from freshwater to brackish water at the upstream extent of the estuary.

In addition, many short reaches of lower Mission Creek are lined with various bank stabilization treatments installed by the City and/or private landowners. Typical treatments include piled stone, sacked concrete, gabions, vertical cement walls, and pipe and wire revetment. These treatments cover approximately 5240 linear ft of embankments (including both banks) and have reduced habitat for fish and wildlife and caused the loss of riparian vegetation. Vegetation that has persisted is highly disturbed with extensive growth of non-natives. The majority of vegetation along embankments is influenced by residential and commercial landscaping.

The County routinely clears sediments and vegetation that accumulate within lower Mission Creek to maintain flood capacity. Vegetation that grows within the channel is mowed and sprayed with herbicides by the County to maintain flood capacity of the channel. Accumulated silts are cleared using loaders. Following flood control maintenance, the channel is often a flat, trapezoidal channel devoid of heterogeneity.

The downstream extent of Mission Creek, extending approximately 1060 linear ft upstream from the mouth of the creek, is tidally influenced. The estuary flows under State Street in the City of Santa Barbara and empties in the Pacific Ocean near Stearn's Wharf and the Santa Barbara Marina. The wharf and beach in this area are used heavily for recreational activities. In the past, the City of Santa Barbara has relocated the mouth entrance to avoid the debris washing into the Marina. The City also artificially breaches the mouth of Mission Creek during summer months to avoid stagnant water, which can be unsightly or have an unpleasant odor, in an area of high tourist use.

STATUS OF SPECIES IN ACTION AREA

There are anecdotal observations of juvenile trout in scour pools in lower Mission Creek. Most of the pools that persist during summer months are located in the lower portion of the project area, and are formed due to scouring below and behind hard bank lining. It is likely that juveniles found in these pools have been washed or actively move downstream and are then unable to move back upstream to more suitable rearing habitat when flows decline rapidly in early summer.

In March 2000, a 27 inch female steelhead spawned within the project area, just downstream of De la Guerra Street. The female created four redds, two of which were fertilized by a smaller male steelhead. It is probable that the steelhead

moved into Mission Creek following a significant rainfall event in late February. And then, as is common for Mission Creek, flows dropped too quickly to provide sufficient water depth at the 0.8 mile Caltrans channel for the female to continue moving upstream to good spawning habitat. If this was the case, then the female was forced to spawn within the upstream reach of the project area, which did not provide optimal conditions for spawning. After spawning, the male migrated downstream, presumably to the ocean. The female did not survive, nor did any of the fertilized eggs.

On May 4, 2000, ACOE and US Fish and Wildlife Service staff observed 2 juvenile steelhead (6-8 inches in length) near the Mason Street Bridge in the Mission Creek estuary. These fish were probably smolts making their way to the ocean, and could have been some of the same fish seen by CDFG at Oak Park a month or so earlier. Thus, there exists the potential for juvenile steelhead to be present within and downstream of the project area during project activities. Furthermore, fish passage must be maintained through the project area for downstream migration of smolts and upstream movement of juveniles and adults.

V. Effects of Project Action

Introduction

Generally, possible effects of the project action on steelhead and their proposed critical habitat are those associated with construction and maintenance of the flood control channel, including excavation of the creek bed and embankments, installation and maintenance of vertical concrete walls and structures, continued excavation and removal of woody debris and vegetation as needed, and relocation and monitoring of steelhead. Anticipated effects involve possible take in the form of capture, trap, harm, harassment, injury, and/or mortality of juvenile steelhead present in the project area, loss and alteration of instream and riparian habitat, loss of aquatic macroinvertebrates, turbidity, and sedimentation. Direct and indirect effects are discussed below. No interrelated or interdependent effects are anticipated.

Methodology for Effects Analysis

Useful quantitative data for the affected area and project action are limited; the assessment of project action effects therefore focuses mostly on qualitative identification. This approach was based on a review of ecological literature concerning the effects of loss and alteration of instream and riparian habitat, turbidity, and sedimentation on steelhead in particular and stream fish populations in general. This information was then compared to the estimated amount of instream, riparian, and aquatic macroinvertebrate losses, estimated background turbidity levels in the creek and associated with the project action, and estimated rates of sedimentation.

EFFECTS TO POPULATION

Migration

Project activities will include extensive dewatering and excavation during three consecutive years. Construction time windows have been incorporated to avoid winter and spring months when upstream migration of adults is most prevalent. No construction within the estuary will occur prior to June 1 of any year. Upstream of the estuary, work could begin as early as April 15, but only if Mission Creek does **not** have continuous surface flow (or less than ½ inch water depth at Caltrans cement channel) between Oak Park and the upper extent of the project area. If surface flow persists, construction will only occur after June 1. Under these conditions, no upstream or downstream migration of adults through the action area is expected, and outmigration of smolts through the action area should be minimal.

Stream diversions and dewatering are designed to allow for steelhead movement through the project area. At any given time only one half of the estuary will be dewatered to allow natural flow and tidal movement within the other half of the estuary. Upstream of the estuary, all flows will be directed through smooth pipe culverts, which allow downstream migration of smolts. Thus, except for the period of time (3-4 days) when the diversion is being constructed or relocated, any juveniles or smolts will be able to move freely through the project area.

Temporary delay in movement could occur for smolts when diversion culverts are being constructed. This artificial delay would only occur if continuous surface water were present. Because ACOE is required to begin construction only after June 1 if surface water is continuous, it is expected that the majority of outmigrating smolts should have moved down through the project area prior to start of project activities. Those individuals still migrating through, however, would be delayed for a period of up to 4 days while the culvert is being constructed. A biologist will be present during all diversion activities to relocate any fish, as necessary, that are delayed while the diversion culverts are put in place.

As described above, a number of possible impediments exist within Mission Creek, which steelhead must traverse to reach upstream spawning and rearing habitat. Under baseline conditions, steelhead must successfully pass through the channelized oxbow portion of the project area, through two Caltrans cement channels, and over numerous small vertical drops formed at bridge crossings. Because of these passage impediments, steelhead in Mission Creek are forced to use energy reserves above and beyond natural demands to reach good spawning habitat. Thus, any additional challenges placed on steelhead could severely delay or decrease successful migration, which in turn could lead to decreases in spawning output. To avoid additional impacts to steelhead

migration, the ACOE will provide suitable conditions, including water depths and velocities, for fish passage through the project area both during and following project construction.

ACOE has completed hydraulic modeling for the project area to analyze existing and post-project streamflow conditions. Table 2 contains pre- and post-project water velocities at representative cross sections throughout the project area. Models incorporate a water conveyance of 640 cfs, which is the estimated mean annual flow or 2.3-year flow event. Based on channel size, this is the upper flow limit for upstream fish migration. By completing analyses at this level, the ACOE is characterizing the highest velocities that steelhead would encounter.

Table 2. Existing and post-project water velocities (ft/sec) modeled at specific cross sections within the project area.

	Water velocity (ft/sec) when conveying 640 cfs		
Cross section	**Existing channel**	**Proposed channel**	**Difference**
11	5	7	2
10	8	6	-2
9	5	3	-2
8	10	5	-5
7	6	4	-2
6	9	4	-5
4	2	4	2
		Average Change	**-2**

Based on this modeling, streamflow velocities will decrease by approximately 1 to 6 fps at five locations and increase by approximately 2 fps at two locations, with an overall net decrease in water velocity over the entire project reach. Resulting velocities range from 3.89 to 6.88 feet per second (fps).

Bell (1990) reports sustained swimming speeds (normal functions without fatigue) for average sized adult steelhead at 0-4.6 feet per second (fps), prolonged swimming speeds (lasting 15 seconds to 200 minutes which result in fatigue) at 4.6-13.7 fps, and burst speeds (activities which cause fatigue in 15 seconds or less) ranging from 13.7-26.5 fps. Data used in the Bell (1973) study are based on steelhead in the Pacific Northwest, which typically are larger, and thus stronger, than Southern California steelhead. Therefore, Southern California steelhead swimming abilities probably lie in the lower or middle range of the above estimates. All of the above water velocities fall within the lower range of estimated prolonged swimming speeds for steelhead. In addition, side baffles will be placed throughout the project area to provide resting areas for migrating steelhead (every 100-200 linear feet between Canon Perdido and Bath Street, every 400-500 ft between Bath and Gutierrez Streets, and every 100-200 feet downstream of Gutierrez). Provided these features occur within the lowflow or wetted channel, steelhead should be able to break the project area into several shorter stretches, rather than traversing the entire channel in one continuous effort. Considering the minor (1.5%) slope, projected velocities and location of rock baffles throughout the project area, NMFS anticipates that the

ACOE flood control channel will provide suitable conditions for upstream migration of adult steelhead.

Ledges, baffles and boulder clusters installed by ACOE will not be of any use to steelhead if they are not contained in the thalwag of the channel. It is possible that natural flow events will establish a lowflow channel that flows away from these structures. It is impossible to determine whether or not this will occur, but in conversations the ACOE has been made aware of this possibility, and has agreed to modify placement of side baffles and boulders, to the maximum extent possible, in order to maximize the benefits realized by steelhead.

As a result of construction activities, the channel invert will be artificially flattened and widened and will lack any natural heterogeneity that is currently present. Under such conditions, fewer resting areas are available, flows are spread out across the channel rather than being concentrated in a lowflow channel, and fewer hard structures are present to break up velocities. Thus, upstream migration of adults is made more difficult. If left alone, the channel will take at least 1 to 2 years to recover to somewhat natural conditions. Furthermore, it is likely that the benefits proposed by the ledges and side baffles will take time to develop since large flows are required to scour out pools under the ledges. ACOE will minimize these impacts by insuring that substrates, representative of natural conditions, are present in the channel following construction and by constructing a lowflow channel that, as close as possible, matches what would be established naturally. Although ACOE will attempt to minimize these temporary effects, some are unavoidable and will increase the amount of effort required of steelhead during upstream migration. NMFS does not, however, anticipate that these impacts will cause a decline in the steelhead population in Mission Creek.

Relocation

Incidental mortality could occur as a result of handling if fish relocations become necessary. All work areas will be surveyed for steelhead prior to any construction or maintenance activities. Any fish found in work areas will be relocated to suitable habitat within Mission Creek. Fish will be caught with nets only; electrofishing will not be utilized. Based on previous experience of NMFS personnel, incidental mortality is expected to occur for only a small percentage (<10%) of the fish that are relocated. Areas in upper Mission Creek, where juveniles would be relocated to, have better habitat (including cover, water quality and temperature) for juveniles to survive and grow through the dry season. Therefore, juveniles that survive relocations will likely have an increased chance of survival than if forced, even under natural conditions, to remain in poor habitat in lower Mission Creek. Given the conditions anticipated during project construction, these fish would certainly die if not relocated out of the construction area.

The number of fish that will need to be relocated, if any, is unknown at this time, but, as mentioned above, should be limited to rearing juveniles and outmigrating smolts. During most years, Mission Creek goes dry between Oak Park and the project area. Any rearing juveniles downstream of the cement channel are limited to the estuary and a limited number of scour pools for oversummering habitat. No records are available on the number of juveniles rearing in lower Mission Creek, but numbers are expected to be low, based on limited pool availability and poor habitat conditions. If we assume that 10 to 20 juveniles (which is likely an overestimate) will have to be relocated, and that 10% will die because of handling, then approximately 1 to 2 juveniles per year would be harmed or killed during relocations.

Observations of juveniles in the project area are isolated and sparse. Casual surveys by NMFS staff in upper Mission and Rattlesnake Creeks document high juvenile abundances (100s) during early summer months over at least 2-3 consecutive years. This information indicates that the upper Mission Creek watershed provides the vast majority, if not all, suitable spawning and rearing habitat for the system. The few juveniles seen rearing in the lower watershed (anecdotal observations) are most likely a small fraction of the juveniles present throughout the entire system.

Estimates of numbers of smolts migrating downstream through the project area also are not available. However, as described above, CDFG personnel observed approximately 100-200 fish (6-8 inches in length) in large pools at Oak Park during March 2000. A few weeks after the time of observation, 2 individuals of the same approximate size were observed in the estuary near the Mason Street Bridge. It is probable that the fish seen in the estuary were some of the same seen at Oak Park, on their way out to the Ocean. If a similar pattern of outmigration occurs during ACOE project activities, smolts may need relocating. Relocation will only be necessary, however, if they are present while diversions are constructed. Once diversions are in place, smolts will be able to move freely through the project area and will not need relocating. As discussed above, the majority of outmigration by smolts is expected to occur prior to the start of project construction. Continuous surface water persists into June only during years with relatively high rainfall. Even if these conditions occur, diversions will require only 1 to 4 days for construction. Because of the timing of diversion activities and limited time period for possible impacts, only a small number of smolts are expected to be present in the project area. NMFS anticipates that no more than 10 smolts, per year, will need relocation. Assuming 10% mortality due to handling, 1 individual smolt will be harmed or killed due to project construction activities.

ALTERATION OF INSTREAM HABITAT

Instream habitat is designated critical habitat within the Southern California ESU for the Federally endangered steelhead. Direct loss or alteration of instream habitat results when creek habitat is removed or modified during construction activities. The extent that steelhead are indirectly harmed by instream habitat alterations depends, in part, on the extent of permanent changes to substrate type, cover complexity, instream habitat complexity, water column depth and velocity patterns. Modifications that degrade the quality of instream habitat may cause reductions in fish abundance (Elser 1968; Hunt 1969; Dolloff 1986; Riley and Fausch 1995).

Project construction will impact, through excavation, grading and shaping approximately 5380 linear ft of instream habitat in Mission Creek (Table 3). Current instream habitat within the proposed project area consists of cement channel, and natural run habitat with a few isolated pools. Portions of this habitat will be unavailable to steelhead during construction. The ACOE flood control project will remove 420 linear ft of the existing cement channel and will leave any existing natural bottom in place. As discussed above, temporary impacts resulting from construction activities are unavoidable. Because of the extensive excavation and grading, the natural bottom will require time to recover and develop heterogeneous features. Under existing conditions, lower Mission Creek provides only limited habitat for oversummering juveniles. Suitable spawning habitat is not present. Because steelhead use the area primarily as a migration corridor, current use of this area will not be altered.

Table 3. Summary of linear feet altered by ACOE construction activities.

Feature	Existing Amount (ft)	Proposed Amount (ft)	Difference (ft)
Hard Channel Lining	1350	930	- 420
Hard Bank Protection	5210	6885	+ 1675

Maintenance of the flood control channel by the County will result in continued impacts to the channel invert of lower Mission Creek. Channel clearing and excavation will be completed any time capacity within a reach is lowered by at least 15%. The County will conduct maintenance activities in a mosaic pattern, as described above [See Project Description section], so that the same area is not impacted during consecutive years. Maintenance activities proposed by the County are the same as those that the County has been implementing for several years. ACOE completed a sediment deposition analysis for the project area, which can be used to determine if construction of the flood control channel will result in more frequent or more extensive maintenance than existing conditions require. Results of the analyses indicate that project construction will result in a net increase of 25 cubic yards of sediment after a 1-year storm event, and net decreases of 35 cubic yards and 385 cubic yards for 5-year and 20-year events, respectively. Thus, recurrent maintenance within the upstream channel and

estuary should be less extensive than current practices until the occurrence of a large storm event (over 20 years).

Although the channel invert will be left to somewhat natural conditions, both embankments along the entire project reach will be lined with vertical cement walls of varying height (Table 3). Considering existing hard bank structures resulting from previous bank stabilization projects, the ACOE flood control channel will result in a loss of approximately 1675 linear feet of natural embankment. Vertical walls that would replace natural embankments do not allow for undercut banks or scour pools that provide important habitat and cover for steelhead. To compensate for the loss of natural embankment, ACOE has incorporated 1190 linear ft of overhanging ledges and 1940 linear ft of rock side baffles to promote formation of scour pools and provide shade and cover. Provided ledges and baffles provide the benefits to steelhead as currently proposed, these features should compensate somewhat for the loss of natural banks.

The additional benefits of natural bank, however, such as woody debris, leaf litter and insect drop, can not be simulated with manmade structures. These features provide important cover and food resources for rearing juveniles. The loss of this input in the project area will further preclude restoration of lower Mission Creek to include suitable rearing habitat. However, the current use of lower Mission Creek as a migration corridor will not be impacted.

Loss of Riparian Habitat

The riparian habitat affected by the project is part of designated critical habitat for the Southern California ESU for the Federally endangered steelhead. The functional values of riparian corridors and the benefits they provide to aquatic systems in general, and stream fish populations in particular, are well documented (Hall and Lantz 1969; Karr and Schlosser 1978; Lowrance et al. 1985; Wesche et al. 1987; Gregory et al. 1991; Platts 1991; Welsch 1991; Castelle et al. 1994; Lowrance et al. 1995; Wang et al. 1997).

Excavation activities will result in a loss of riparian vegetation along 7310 linear feet of embankment. Loss of riparian trees might increase the extent of solar radiation and fine sediment input to the creek, increase stream temperatures, reduce insect drop, and decrease the amount of woody debris input to streams. As much as is practicable, large sycamores will be avoided. As part of project activities, the ACOE has incorporated an extensive re-vegetation plan to mitigate for loss of existing trees and vegetation and to establish a healthy riparian corridor. The majority of vegetation that will be impacted consists of non-native vegetation, such as giant reed. These non-natives will be replaced with native vegetation and, ultimately, will improve the qualities of the riparian corridor. Riparian vegetation that provides shade, cover and insect drop for steelhead, however, will take a number of years to develop.

A shading analysis (Sierra Land Designer – 3D) was conducted to estimate the amount of Mission Creek that will be shaded following revegetation. The analysis concludes that upstream of Highway 101, Mission Creek will be completely shaded in 5 to 10 years. Fast growing willows and shrubs should provide some shading within the first 1 to 2 years. Under existing conditions downstream of Highway 101, the majority of shading is provided by buildings and houses, non-native giant reed, and some large sycamores. The sycamores will be left in place, as much as is practicable. Loss of giant reed will lessen shading in the short term, but replacement with sycamores and willows will eventually provide increased cover and shading within a few years. Phased construction over the course of 3 years insures that the entire reach will not be completely devoid of shading or vegetation at any given time. Although loss of natural cover and shading will occur temporarily following construction, shading and cover should begin to recover after 1 to 2 years.

Vegetation within the channel invert will be limited in size and nature during the County's routine maintenance activities. Vegetation greater than 4 inches in diameter will not be allowed to grow within the channel invert. These maintenance activities are currently conducted routinely throughout Santa Barbara County, including lower Mission Creek. Vegetation clearing is not expected to alter steelhead use of the project area, especially with shading and cover expected from the vegetated sideslopes and wall ledges.

SEDIMENTATION AND TURBIDITY

Turbidity refers to the amount of light that is scattered or absorbed by a fluid. Elevated levels of turbidity may result when fine sediment is contributed to the creek during project activities. High turbidity concentrations can cause fish mortality, reduce fish feeding efficiency, and decrease food availability (Berg and Northcote 1985; McLeay et al. 1987; Gregory and Northcote 1993; Velagic 1995). Turbidity may cause indirect harm, injury, or mortality to juvenile steelhead in the vicinity and downstream of the worksites due to decreases in respiratory function, feeding and/or growth (Waters 1995). Sedimentation occurs when fine sediments, such as those suspended during project activities, settle out of the water column and onto the creek substrate. Substantial sedimentation rates could bury less mobile organisms that serve as a food source for many fish species (Ellis 1936; Cordone and Kelley 1961), degrade instream habitat conditions (Cordone and Kelley 1961; Eaglin and Hubert 1993), cause reductions in fish abundance (Alexander and Hansen 1986; Berkman and Rabeni 1987), and reduce growth in salmonids (Crouse et al. 1991).

Channel excavation and grading could result in an increase of fine sediments within the creek channel. This would cause increased turbidity and sedimentation if these sediments are suspended and washed downstream during the following winter storm events. Because embankments will be armored with

vertical cement walls, sediment input will be limited to the channel invert and erosion of topsoil placed on top of riprap sideslopes. In order to minimize inputs of sediments into Mission Creek, ACOE will use pipe culverts to divert streamflow around project areas during excavation, grading and revegetation. In addition, any bare soil along the sideslopes will be covered with landscaping mat until vegetation has established enough to stabilize the soil.

As water levels drop during summer months, exposure to sun and wind causes sediment to loosen and dry. Thus, high turbidity and sedimentation occurs naturally during early winter storm events when unconsolidated sediments are suspended and washed downstream. Unconsolidated sediments resulting from project activities are expected to be washed downstream during the first rain event of each year when background levels are high. Although these background levels will be increased due to project activities, the increase will be limited to sections within the lower 1.2 miles of the creek and are expected to be temporary. Steelhead could be temporarily delayed if turbidity levels are too high to allow migration. NMFS expects, however, that the degree of increase will not increase significantly over background levels to delay migration.

VI. Cumulative Effects

Cumulative effects include the effects of future state, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. The NMFS is generally familiar with actions affecting steelhead in Mission Creek and is unaware of such actions that would be reasonably certain to occur within the action area. Future Federal actions that are unrelated to the project action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA. Consequently, NMFS believes no cumulative effects are likely.

VI. Summary

Steelhead occurring within the project area during construction will be limited mainly to rearing juveniles and outmigrating smolts. Minor amounts of harassment and incidental mortality could occur (10-20 fish captured and 1-2 individuals experience mortality during relocations) during stream diversion and relocations. This small number of individuals affected is not expected to affect the survival of the steelhead population in Mission Creek or the survival and recovery of the Southern California ESU.

NMFS expects 5380 linear ft of temporary and permanent impacts to designated critical habitat, along the channel invert and both embankments, resulting from the project action. Within this area, project construction will result in the permanent loss of natural banks, and temporary degradation to the stream bed and riparian vegetation. In addition, maintenance activities will result in ongoing impacts to the stream bed. These impacts, however, will not alter the current use

of lower Mission Creek as a steelhead migration corridor. Furthermore, with the maintenance of a natural bottom channel bed, incorporation of fish baffles and ledges, and enhancement of the riparian corridor, including replacement of non-native with native vegetation, these impacts are not expected to diminish the value of habitat for the survival and recovery of the Mission Creek population or of the Southern California ESU.

VII. CONCLUSION

After reviewing the best scientific and commercial data available and the current status of steelhead, the environmental baseline for the action area, the effects of the ACOE flood control channel, and the cumulative effects, it is the opinion of NMFS that the ACOE project action is not likely to jeopardize the continued existence of the Federally endangered Southern California steelhead ESU and is not likely to destroy or adversely modify designated critical habitat.

INCIDENTAL TAKE STATEMENT

Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. Harm is further defined to include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavior patterns, including breeding, spawning, rearing, migrating, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and 7(o)(2), taking that is incidental to and not intended as part of the proposed action is not considered to be prohibited taking under the Act provided that such taking is in compliance with an Incidental Take Statement.

The measures described below are nondiscretionary, and must be undertaken by the ACOE so that they become binding conditions of any grant or permit issued to the County, as appropriate, for the exemption in section 7(o)(2) to apply. The ACOE has a continuing duty to regulate the activity covered by this incidental take statement. If the ACOE (1) fails to assume and implement the terms and conditions or (2) fails to require the County to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the County must report the progress of the action and its impact on the species to NMFS as specified in the incidental take statement (50 CFR 402.14(i)(3)).

I. EXTENT OF TAKE

The NMFS believes the proposed ACOE flood control project on Mission Creek, Santa Barbara County, California, may result in the incidental take of steelhead. Any incidental take resulting from the ACOE flood control project will mostly likely be limited to outmigrating smolts or rearing juveniles located within the project area. Incidental take in the form of harassment, harm, or mortality could occur if fish are unable to migrate through the project area. In addition, incidental take could occur in the form of "harassment, collection capturing and/or mortality" if it becomes necessary to relocate individuals out of the project area. It is anticipated that relocation will occur on an annual basis during project construction (3 yrs). NMFS expects that mortality of fish due to handling during relocation will probably be less than 10 percent of captured fish.

Juveniles have been observed in scour pools within the project area. If juveniles are found prior to construction or maintenance activities, ACOE or the County shall relocate them. Conservatively, NMFS expects that less than 10 juveniles will be located in the project area each year at the time of project construction activities. Thus, NMFS does not anticipate mortality of rearing juveniles beyond one individual per year.

As discussed above, the majority of outmigration by smolts is expected to occur prior to the start of project construction. Continuous surface water persists into June only during years with relatively high rainfall. Even if these conditions occur, diversions will require only 1 to 4 days for construction. Because of the timing of diversion activities and limited time period for possible impacts, only a small number of smolts are expected to be present in the project area. NMFS anticipates that no more than 10 smolts per year, will need relocation. Assuming 10% mortality due to handling, 1 individual smolt will be harmed or killed per year of construction activities due to relocations. No harm or mortality should occur to smolts as a result of maintenance activities.

The accompanying biological opinion does not anticipate any form of take that is not incidental to the proposed project action. This Take Statement anticipates no mortality beyond one juvenile and one smolt during any year. If recurrent mortality occurs, or if mortality beyond 10 percent of steelhead being relocated (not to exceed 1 juvenile and 1 smolt per year), the ACOE shall reinitiate consultation.

II. Effect of Take

In the accompanying biological opinion, NMFS concluded that the anticipated level of take associated with the project action is not likely to jeopardize the continued existence of the Federally endangered Southern California steelhead ESU.

III. Reasonable and Prudent Measures

NMFS believes the following reasonable and prudent measures are necessary and appropriate to minimize and monitor incidental take of steelhead:

1. The ACOE shall avoid and minimize impacts to steelhead from construction and maintenance activities.

2. The ACOE and County shall minimize the extent of permanent changes to instream and riparian habitat.

3. The ACOE and County shall minimize cumulative impacts and/or delays to fish migration in Mission Creek.

4. The ACOE and County shall monitor the project area to ensure correct project implementation and to minimize the take of steelhead incidental to project operations.

IV. Terms and Conditions

In order to be exempt from the take prohibitions of the ESA, the ACOE must comply and/or ensure that the County complies with the following terms and conditions, which implement the reasonable and prudent measures described above and outline reporting/monitoring requirements. These terms and conditions are non-discretionary:

1. The following terms and conditions implement reasonable and prudent measure No. 1.

A. ACOE shall complete any construction activities occurring downstream of Yanonali Street between June 1 and November 30 of any year.

B. ACOE shall complete any construction activities occurring upstream of Yanonali Street between June 1 and November 30 of any year if continuous surface flow (or more than ½ inch water depth in Caltrans channel immediately upstream of project area) is present between Oak Park and the project area. If continuous surface flow is **not** present between Oak Park and the project area, activities may occur between April 15 and December 1 of any given year.

C. The County shall complete all maintenance activities between August 1 and October 31 of any given year.

D. Downstream of Yanonali Street, ACOE shall isolate and dewater only one side of the channel at a time to allow normal tidal flushing and unimpeded stream flows within the other half. Any water remaining within the work site shall be pumped through a filter to capture any silt and then into the wetted area surrounding the enclosure.

E. Upstream of Yanonali Street, ACOE shall divert all stream flow through pipe culverts. Culverts shall be smooth along the inside lining and at any culvert joints. Combined capacity of the culverts shall be at least 40 cfs. Any water remaining within the work site shall be pumped through a filter to capture any silt and then into the diversion channel.

F. A fishery biologist with expertise in the areas of fish biology and ecology, fish/habitat relationships, biological monitoring, and handling, collecting, and relocating salmonid species shall be responsible for all required monitoring of the project area. The biologist will survey the project area by snorkeling or visual observations from the embankments prior to any project activities, including all diversion, construction and maintenance activities. No diversion, construction or maintenance activities shall occur while steelhead are present.

G. The biologist shall capture any steelhead located in project areas and relocate the individuals to suitable instream habitat in Mission Creek. All relocations shall be coordinated with NMFS and CDFG and shall be conducted as described in the attached Biological Opinion.

H. The biologist shall monitor construction activities, instream habitat, and performance of sediment control/detention devices for the purpose of identifying and reconciling any condition that could adversely affect steelhead or their habitat. The biologist shall be empowered to halt work activity and to recommend measures for avoiding adverse effects to steelhead and their habitat.

I. The ACOE biologist shall contact NMFS (Anthony Spina, 562-980-4045) immediately if one or more steelhead are found dead or injured. The purpose of the contact shall be to review the activities resulting in take and to determine if additional protective measures are required. Subsequent notification must also be made in writing to NMFS (501 W. Ocean Blvd., Suite 4200, Long Beach, California 90802) within five days of noting dead or injured steelhead. The written notification shall include the date, time, and location of the carcass or injured specimen, a color photograph, cause of injury or death, and name and affiliation of the person who found the specimen.

J. When practical, ACOE and the County shall use existing points of ingress or egress, or perform work from the top of the creek banks, for the purposes of avoiding work and heavy equipment in flowing water, and disturbing creek bank vegetation, and instream habitat.

K. Erosion control and sediment detention devices shall be incorporated into the ACOE project and implemented at the time of the project action. These devices shall be in place during construction, maintenance, and after if necessary, for the purpose of minimizing sediment and sediment/water slurry input to flowing water. The devices shall be placed at all worksites where likelihood of sediment input exists. The devices shall be maintained at least once daily. Sediment collected in the devices shall be disposed of off site.

L. Refueling of heavy equipment and vehicles will occur only within a designated area where potential spills can be readily contained. Equipment shall be checked and maintained to prevent leaks of fuels, lubricants or other fluids into the stream.

2. The following terms and conditions implement reasonable and prudent measure No. 2.

A. The ACOE shall photograph the project site before, during and immediately after the project is completed and develop a reference of instream and riparian habitat characteristics.

B. The ACOE shall insure substrate, representative of natural conditions, are present in the channel following construction activities. The basis for natural conditions shall be based on planned geotechnical surveys and pebble counts completed at locations within the project area that are most representative of natural conditions (e.g., between Ortega and De la Guerra Streets, between Bath and Cota Streets, upper end of oxbow below Gutierrez).

C. The County shall insure that representative types and sizes of substrate, such as small rocks or boulders, are present in the channel following maintenance activities.

D. Following construction activities, ACOE shall construct a lowflow channel that extends the length of the project area and that reflects what would be formed through natural processes.

E. Following maintenance activities, the County shall construct a lowflow channel that extends the length of the project area and that reflects what would be formed through natural processes.

F. The ACOE shall minimize disturbance to riparian and upland vegetation. All native vegetation removed for project activities will be disposed of off site or utilized during post construction revegetation. The ACOE shall implement a full re-vegetation plan including planting of at least 120 trees on channel sideslopes, at least 330 trees in habitat expansion area and hydroseeding with native grasses and shrubs.

G. The ACOE shall monitor growth and survival at the revegetated sites for 5 years following completion of project construction for the purpose of assessing the growth of the plantings or seedlings. The County shall photograph each site during each inspection.

3. The following terms and conditions implement reasonable and prudent measure 3.

A. ACOE shall develop a Streamflow Monitoring Plan, to be approved by NMFS, with the purpose of documenting flow conditions within the completed flood control channel. The plan shall include monitoring of stream flows, benchmark water velocities and depths, interactions between rock baffles and the lowflow channel, and any opportunistic observations of steelhead migration. The monitoring plan shall be completed, and approved by NMFS prior to the start of any project activities.

B. Based on methods outlined in the monitoring plan, all monitoring data shall be collected and compiled as soon as is practicable, based on streamflows,

within a time period not to exceed five years following construction of the flood control channel.

C. If the information collected during monitoring indicates that the flood control channel is not providing suitable conditions for upstream steelhead migration, the ACOE shall modify the channel, as necessary, to provide passage.

D. ACOE shall complete hydraulic analyses to characterize existing flow conditions within the Caltrans channel located immediately upstream of the project area.

4. The following terms and conditions implement reasonable and prudent measure 4.

A. The ACOE shall provide a written monitoring report to the NMFS within 15 working days following each fish relocation effort. The report shall include: the number and size of steelhead relocated from the project site, a specific description of locations where fish are relocated to, the number and size of steelhead relocated to each location, a description of any problem encountered during relocation, the number and size of any steelhead killed or injured during relocation, and any effect of the project action on steelhead that was not previously considered.

B. The ACOE shall provide a written monitoring report to the NMFS within 20 working days following completion of the project action of each work year. The report shall include the number of steelhead removed from the project site and killed or injured during the project action and biological monitoring; a description of any problem encountered during the project or when implementing terms and conditions; the number and size of steelhead noted and relocated; any effect of the project action on steelhead that was not previously considered; and pre- and post-project photographs documenting compliance with Reasonable and Prudent Measures No. 1 and 2.

C. The ACOE shall provide a written report describing results of the revegetation measures to the NMFS within 20 working days following completion of revegetation. The report shall include a description of the sites planted or seeded, the area (ft^2) revegetated at each site, a plant palette for each site, planting or seeding methods, and pre- and post-planting color photographs of each site.

D. The ACOE shall provide a written report describing the results of the revegetation measures as observed during annual site inspections to NMFS by August 15 of each monitoring year. The report shall include the color photographs taken of each site during each inspection, the color photographs taken before and after implementation of the project, survival and growth of plantings or seedlings, and observations noted by the biologist.

E. The ACOE shall provide a written report describing the results of the Streamflow Monitoring to NMFS by August 15 of each monitoring year. The report shall include interpretation and data for stream flows, water velocities, water depths, and baffle observations.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

NMFS recommends the following conservation recommendations to be carried out by the ACOE and/or the County for the Lower Mission Creek Flood Control Channel:

1. Despite the additional flood control protection provided by the ACOE project, NMFS encourages the City, County and ACOE to strive towards restoring Mission Creek to more natural habitat in the future. In order to provide natural habitat, which would also provide the needed flood control protection, both the creek channel and surrounding flood plain would need to be increased, and banks would need to be sloped back. Therefore, the City, County and ACOE need to limit further development within the floodplain and pursue acquisition of existing properties along the creek.

2. Implementation of measures to provide improved fish passage through the cement channel located directly upstream from the project location.

3. Implementation of measures to provide improved fish passage through Mission and Rattlesnake Debris Basins.

4. Implementation of measures to provide improved fish passage through the Botanical Gardens.

In order for NMFS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the NMFS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in the ACOE's request for consultation dated June 20, 2000. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion, (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion, or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, formal consultation shall be reinitiated immediately. During reinitiation, NMFS, ACOE and the County shall review and modify construction and/or maintenance techniques, reassess the techniques used for fish relocations, modify the placement of side baffles and ledges to provide the projected benefits for steelhead, and assess need for implementation of recommended conservation measures.

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APPENDIX 9

Streambed Alteration Agreement - Permit

CALIFORNIA DEPARTMENT OF FISH AND GAME
SOUTH COAST DISTRICT
4949 VIEW RIDGE AVENUE
SAN DIEGO, CA 92123

LAKE OF STREAMBED ALTERATION AGREEMENT
NOTIFICATION NO. 1600-2009-0370-R5
Mission Creek

SETH SHANK
LOWER MISSION CREEK FLOOD CONTROL PROJECT

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Game (DFG) and Seth Shank of the Santa Barbara Flood Control District (Permittee).

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) Section 1602, Permittee notified DFG on December 16th, 2009, that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC Section 1603, DFG has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement.

PROJECT LOCATION

The project is located at the lower 1.2 miles of Mission Creek, between Canon Perdido Street and Cabrillo Boulevard, within the City of Santa Barbara, in the County of Santa Barbara, State of California; Latitude -119.690223, Longitude 34.412179 or Section 22, Township 4N, Range 27W, U.S. Geological Survey (USGS) map: San Bernardino Baseline.

PROJECT DESCRIPTION

The project is designed as a restoration project, and to increase the flood capacity to a 20 year event level by redesigning the banks from a concrete trapezoidal shape, to vertical concrete walls for the lower half, and sloped ungrouted rock rip-rap upper banks

at a 1:5.1 slope, with native plantings for the upper half of the banks. This will increase the capacity to 3,400 cfs. The final configuration will have a width range from 60 to 70 feet at the top, and an average depth of 8 to 12 feet throughout the project site. A natural bottom will be maintained or restored to natural sediments where hardened concrete is now present. The rock rip-rap will be covered with top soil, and pipes will be placed through the rip-rap to allow the planting of native trees. A native understory will be planted along the project site, under the trees to ensure a complete canopy of the creek. Within two short reaches, just upstream of the Haley/De la Vina and De la Guerra Bridges, the above bank treatments will occur only on the southeast bank. Vertical wall will be maintained for the remainder of the small reaches. New culverts will be constructed between Gutierrez and Chapala Street Bridges to bypass an oxbow. This consists of two 15-foot by 6-foot high boxes, connecting both ends of the oxbow. A weir will be constructed at the inlet of the culvert to direct low flows through the oxbow, and to split higher flows between the culvert and the oxbow. Five small parcels of open land would be left along the banks, ranging in size from 0.03 and 0.14 acres, and these parcels will be planted with native vegetation, expanding the riparian habitat, and providing open space for residences. The area between Canon Perdido Street and Cabrillo Boulevard Bridge will be excavated (82,000 cubic yards) to increase the creek capacity. Material to be removed includes burlap bag concrete walls, masonry walls, shot-crete walls, gabions, wooden pilings and other various bank materials. All materials will be recycled if possible. A pilot channel will be scored into the bottom, approximately 1 foot deep, and 10 to 12 feet wide, and would be allowed to collect rock, cobbles and boulders. Mitigation for fish consists of providing resting places for migrating steelhead by constructing artificial overhangs projecting from the walls, and placing double rows of coarse boulders between the overhangs along the creek walls, and rock energy dissipaters. Mitigation for tidewater goby consists of coarse surface relief of the walls. Maintenance for the project will only be covered until this Agreement expires, (12/1/2013). Future maintenance will require the Permittee to obtain a new Agreement.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: **fishes**: tidewater goby (*Eucyclogobius newberryi)*, steelhead (*Oncorhynchus mykiss irideus)*; **amphibians**: Pacific tree frogs (*Hyla regilla);* **reptiles**: western fence lizard (*Sceloorus occidentalis)*; **birds**: brown pelican (*Pelicanus occidentalis*), barn swallow (*Hirundo rustic),* great blue heron (*Ardea herondias),* great egret (*Casmerodias albus),* snowy egret (*Egretta thula),* scrub jay (*Aphelocoma californica),*crow (*Corvus brachyrhynchos),* mockingbird (*Mimus polyglottos),* towhee (*Pipilo crissalis),* house finch (*Carpodacus mexicanus)*; **mammals**: striped skunk (*Mephitis mephitis),* raccoon (*Procyon lotor)*; **native plants**: coast live oak (*Quercus agrifolia),* arroyo willow (*Salix lasiolepis),* sycamore (*Platanus racemosa),* cottonwood (*Populus fremontii),* alder (*Alnus rhombifoia*), cattail (*Typha domingensis)* ; and other aquatic and wildlife resources in the area, including the riparian vegetation which provides habitat for such species in the area. These resources are further detailed and more particularly

described in the reports entitled "Santa Barbara County Streams-Lower Mission Creek Feasibility Study": Final EIS/EIR, dated September 2000, prepared by prepared by the US Army Corp of Engineers.

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to DFG personnel, or personnel from another state, federal, or local agency upon request.

1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

1.3 Notification of Conflicting Provisions. Permittee shall notify DFG if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, DFG shall contact Permittee to resolve any conflict.

1.4 Project Site Entry. Permittee agrees that DFG personnel may enter the project site at any time to verify compliance with the Agreement.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

Vegetation removal and restoration

2.1 Tree removal: Any oaks, CA black walnuts, alders and sycamores which are damaged or removed during construction operations shall be replaced in kind at a 10:1 ratio. Valley oaks shall be replaced in kind at a 15:1 ratio. Elderberry, cottonwood, and willows shall be replaced at 5:1.

2.2 Success ratios: All planting shall have a minimum of 80% survival the first year and 100% survival thereafter and/or shall attain 75% cover after 3 years and 90% cover after 5 years for the life of the project. Prior to the mitigation site(s) being determined

successful, they shall be entirely without supplemental irrigation for a minimum of 2 years, no single species shall constitute more than 50% of the vegetative cover, no woody invasive species shall be present, and herbaceous invasive species shall not exceed 5% cover. If the survival, cover and other requirements described in this Agreement and in the submitted documents have not been met, the Permittee is responsible for replacement planting to achieve these requirements. Replacement plants shall be monitored with the same survival and growth requirements for 5 years after planting.

2.3 Irrigation: The Permittee shall provide irrigation when natural moisture conditions are inadequate to ensure survival of plants. Irrigation shall be provided for a period of at least two years from planting. Irrigation shall be phased out during the fall/winter of second year unless unusually severe conditions threaten survival of plantings. All plants must survive and grow for at least three years without supplemental water for the restoration phase of the project to be eligible for acceptance by the Department. All planting shall be done between October 1 and April 30 to take advantage of the winter rainy season.

2.4 Plant sources: Any replacement tree stock, which cannot be grown from cuttings or seeds, shall be obtained from a native plant nursery, and shall be ant free. The Permittee shall provide a list of all materials which must be obtained from other than onsite sources.

2.5 Exposed areas: Restoration shall include the revegetation and/or reseeding of all stripped or exposed work areas with vegetation native to the area.

2.6 Limits of disturbance: Disturbance or removal of native vegetation shall not exceed the limits approved by the Department.

2.7 Project delineation: The work area shall be flagged or marked to identify its limits within the stream and reservoir. Vegetation shall not be removed or intentionally damaged beyond these limits.

2.8 Vegetation removal: In areas of temporary disturbance, where vegetation must be removed, native trees and shrubs, with DBH of 3 inches or less, shall be cut to ground level with hand operated power tools rather than by grading.

2.9 Vegetation stock piles: Vegetation removed from the stream shall not be stockpiled in the stream bed or on its bank. The sites selected on which to push this material out of the stream should be selected in compliance with the other provisions of this Agreement.

2.10 Oak root protection: No equipment shall be operated within the dripline of oaks. Protective fencing shall be placed around the dripline of oaks to prevent compaction of the root zone.

Wildlife protection

2.11 Bird nesting season: The Permittee shall not allow any vegetation removal within the site from March 1st to August 15th, the recognized breeding, nesting and fledging season for most bird species. If vegetation has to be removed within these dates, a qualified biologist shall conduct bird surveys for nesting birds. If a listed species is found, a qualified biologist shall conduct 8 bird surveys, 10 days apart, in compliance with Fish and Wildlife Service protocols. If listed bird species, such as least Bell's vireo, are found, the Permittee shall not allow any activity within the site from March 1st. to September 1st.

2.12 Storm season: The Permittee's activities within the stream course shall be limited to the dry period of the year from May 1 to December 15 or when the stream is not actively flowing, or at its lowest flow, and no measurable rain is forecasted within 48 hours. If measurable rain is predicted within 48 hours during construction, all activities shall cease for the season, or if before December 1st, until storm flows have returned to pre-storm conditions, and protective measures to prevent siltation or erosion shall be implemented/maintained.

2.13 T&E species surveys: The Permittee certifies by signing this agreement that the project site has been surveyed and shall not impact any rare, threatened or endangered species; or the Permittee certifies that such a survey is not required for the proposed project. If it is determined later that rare, threatened or endangered species occur within the proposed work area, within 500 feet, or could be impacted by the work proposed, the Permittee shall cease immediately, all activities and consult with the Department and obtain any required State and/or Federal permits, and/or submit plan to avoid any impacts.

2.14 Monitoring: A qualified biological monitor, having the appropriate permits, shall be on site at least twice a week during normal operations and shall survey for species prior to construction. The monitor shall be on site on a daily basis during the start of construction, during water diversion, and if listed species are present within 500 feet of any work. If any species are found in the path of construction, the monitor shall relocate the species to a safe location. Relocation areas shall be identified prior to the start of construction, and are subject to the Department's approval. If any species are found in the path of construction, the monitor shall relocate the species to a safe location. The monitor shall have the ability to stop activities if continued activities will impact resources.

2.15 Exclusionary fencing: Exclusionary fencing or sheet piling shall be erected to prevent the migration into or the return of species into the work site. Field notes shall be kept and submitted to the Department after the first week of operations and upon completion of the project.

2.16 Aquatic organisms: Vehicles shall not be driven or equipment operated in water

covered portions of a stream or lake, or w here wetland vegetation, riparian vegetation, or aquatic organisms may be destroyed, except as otherwise provided for in the Agreement.

2.17 Bats: If bats are present, the Permittee shall set up buffers and mitigation measures, approved by the Department prior to implementation, and shall have a monitor determine if activities are impacting the colony.

Steelhead fish passage

2.18 Water flows: When any temporary dam or other artificial obstruction is being constructed, maintained, or placed in operation, sufficient water shall at all times be allowed to pass downstream to maintain aquatic life below the dam pursuant to Fish and Game Code Section 5937.

2.19 Barriers: When any structure/culvert placed within a stream where fish do/may occur, shall be designed, constructed and maintained such that it does not constitute a barrier to upstream or downstream movement of aquatic life, or cause an avoidance reaction by fish that impedes their upstream or downstream movement. This includes but is not limited to the supply of water at an appropriate depth, temperature, and velocity to facilitate upstream and downstream fish migration. If any aspect of the proposed project results in a long term reduction in fish movement, the operator shall be responsible for all future activities and expenditures necessary (as determined by the Department) to secure passage of fish across the structure. Fish ledges are proposed along sections of the vertical bank, these ledges shall be at least 24 inches above the invert, and shall extend no less than 24 inches from the wall.

2.20 Seasons: No work shall be conducted within the flowing or ponded water within the river, which has potential to support steelhead. Adult steelhead are expected to be in the area during periods of high flow (January through March) and smolt are likely to be in the area during periods of receding flows (March to July). The Permittee shall not work during these times unless permitted by NOAA. A National Marine Fisheries Biologist shall be contacted to coordinate additional fish salvage and avoidance measures.

2.21 Reporting: If flowing or ponded water is within the proposed work limits of a stream known to have, or could contain steelhead, the Permittee shall telephone the senior biologist, Mary Larson at (562) 342-7186 and/or Natasha Lohmus, prior to commencing activities within the bed, bank, and channel. The Permittee shall leave his/her name, date and time called, telephone number, the stream name, work location, nature of planned activities and proposed schedule. The Permittee shall report all fish mortality immediately to the Department, and to NOAA Fisheries.

2.22 Fish surveys: If flowing or ponded water is within the proposed work limits, the Permittee shall have a qualified fisheries biologist survey the proposed work area to

verify presence/absence of the any sensitive fish species and any other species of special concern which may occur within the area. Survey methods shall conform to the current U. S. National Marines Fisheries Service and the California Department of Fish and Game. If any T/E species are found, the Permittee shall cease all work within a mile radius of the sighting and in all water (flowing or impounded) and shall contact the Department within 24 hours of the sighting and shall request an onsite inspection by the Department representative (to be done at the discretion of the Department) to determine if work shall proceed. The results of the surveys shall be provided to the Department, along with copies of all field notes, prior to the completion of work or as otherwise specified. The survey techniques shall be approved by the Department, in writing, and the researcher shall have the required State and federal permits.

Tidewater goby

2.23 Goby survey: The Department recommends that the Operator have a qualified fishery biologist survey the proposed work area to verify the presence/absence of the tidewater goby. Survey techniques shall be approved by the U.S. Fish and Wildlife Service and the Department. Any variations from these techniques shall be approved by the Department, in writing. The results and analysis of these surveys shall be provided to the U.S. Fish and Wildlife Service and the Department, along with copies of all field notes, prior to the initiation of work. The fishery biologist shall have the required federal permits.

Equipment and access

2.24 Ramps: Access to the work site shall be via existing roads and access ramps. If no ramps are available in the immediate area, the Applicant may construct a ramp in the footprint of the project. Any ramp shall be removed upon completion of the project.

2.25 Contaminated equipment: All equipment shall be washed and free of weed seeds prior to delivery to the site.

Structures

2.26 Rock rip-rap: Rock rip-rap may be placed in areas where other methods of bank protection are not possible. Voids between the rocks shall be filled with soil to allow vegetation to grow. Revegetation shall be required within the rip-rap. This agreement does not authorize the use of grouted rock.

2.27 Culverts: Installation of culverts or other structures shall be such that water flow (velocity and low flow channel width) is not impaired. Bottoms of temporary culverts shall be placed at or below stream channel grade. Bottoms of permanent culverts shall be placed below stream channel grade deep enough so that sediments accumulate at the bottom to mimic a natural bottom. If any structure is cast in place, the area poured shall be completely bermed and isolated to contain all and any wet cement, even if

water is not present. The pH of hot concrete may be as high as 13 which is toxic to wildlife.

2.28 Water flows through culverts: Any structure/culvert placed within a stream where fish do/may occur, shall be designed, constructed and maintained such that it does not constitute a barrier to upstream or downstream movement of aquatic life, or cause an avoidance reaction by fish that impedes their upstream or downstream movement. This includes but is not limited to the supply of water at an appropriate depth, temperature, and velocity to facilitate upstream and downstream fish migration. If any aspect of the proposed project results in a long term reduction in fish movement, the Permittee shall be responsible for all future activities and expenditures necessary (as determined by the Department) to secure passage of fish across the structure.

2.29 Storm drains: Any storm drains lines/culverts shall be adequately sized to carry peak storm flows for the drainage to one outfall structure. The storm drain lines/culverts and the outfall structure shall be properly aligned within the stream and otherwise engineered, installed and maintained, to assure resistance to washout, and to erosion of the stream bed, stream banks and/or fill. Water velocity shall be dissipated at the outfall, to reduce erosion.

2.30 Obstructions: Any temporary dam or other artificial obstruction shall only be built from materials such as clean gravel/rock/boulders which will cause little or no siltation, and shall be approved by the Department prior to construction.

Sedimentation

2.31 Spoil sites: Permanent spoil storage sites shall not be located within a stream, where spoil can be washed back into a stream/lake, or where it will cover aquatic or riparian vegetation.

2.32 Construction materials: Any materials placed in seasonally dry portions of a stream or lake that could be washed downstream or could be deleterious to aquatic life shall be removed from the project site prior to inundation by high flows.

2.33 Disturbed soils: Areas of disturbed soils with slopes toward a stream or lake shall be stabilized to reduce erosion potential. Planting, seeding and mulching is conditionally acceptable. Where suitable vegetation cannot reasonably be expected to become established, non-erodible materials, such as coconut fiber matting, shall be used for such stabilization. Any installation of non-erodible materials not described in the original project description shall be coordinated with the Department. Coordination may include the negotiation of additional Agreement provisions for this activity.

2.43 Turbid water: Silty/turbid water from dewatering or other activities shall not be discharged into the stream. Such water shall be settled, filtered, or otherwise treated prior to discharge. The Permittee's ability to minimize turbidity/siltation shall be the

subject of pre-construction planning and feature implementation.

2.34 Wash water: Water containing mud, silt, or other pollutants from equipment washing or other activities, shall not be allowed to enter a lake or flowing stream or placed in locations that may be subjected to high storm flows.

Pollution and clean up

2.35 Wet concrete: No concrete or any cement product may be poured if measurable rain is forecasted within 15 days. If any concrete is poured after November 1st, a quick cure ingredient shall be added to the concrete mix to ensure a faster set or drying time. Cement and concrete shall not be poured within 150 feet of a stream during the rainy season. Cement shall not be poured in or near a flowing stream, to reduce the potential for significant adverse impacts to the stream, water, or biota without prior approval.

2.36 Waste: No debris, soil, silt, sand, bark, slash, sawdust, rubbish, construction waste, cement or concrete (wet or dry) or washings thereof, asphalt, paint, oil or other petroleum products or any other substances which could be hazardous to aquatic life, or other organic or earthen material from any logging, construction, or other associated project related activity shall be allowed to contaminate the soil and/or enter into or placed where it may be washed by rainfall or runoff into, waters of the State. Any of these materials, placed within or where they may enter a stream or lake, by the Permittee or any party working under contract, or with the permission of the Permittee, shall be removed immediately. When operations are completed, any excess materials or debris shall be removed from the work area. No rubbish shall be deposited within 150 feet of the high water mark of any stream or lake.

2.37 Clean up: The clean-up of all spills shall begin immediately. The Department shall be notified immediately by the Permittee of any spills and shall be consulted regarding clean-up procedures. If vacuum trucks or pumps are used to clean up any contamination in water, or for any other use, the vacuum hose shall be placed in a 3 to 4 square foot area, protected on all side by exclusionary fencing to lower velocities and to prevent the uptake of any aquatic life.

2.38 Dust control: No stream water may be used in construction, such as in dust control. All construction water shall be from developed sources.

2.39 Marking storm drains: The Permittee shall mark/sign/stencil all storm drains warning that dumping is illegal and all storm drains drain to creeks/rivers or ocean.

2.40 Litter: The Permittee shall comply with all litter and pollution laws. All contractors, subcontractors and employees shall also obey these laws and it shall be the responsibility of the operator to insure compliance.

2.41 Equipment checks: Any equipment or vehicles driven and/or operated within or adjacent to the stream/lake shall be checked and maintained daily, to prevent leaks of materials that if introduced to water could be deleterious to aquatic life.

2.42 Staging areas: Staging/storage areas for equipment and materials shall be located outside of the stream/lake.

2.43 Stationary equipment: Stationary equipment such as motors, pumps, generators, and welders, located within or adjacent to the stream/lake shall be positioned over drip pans. If welders are used, fire suppression equipment shall be on site at all times the welder is being used.

2.44 Equipment maintenance: No equipment maintenance shall be done within or near any stream channel or lake margin where petroleum products or other pollutants from the equipment may enter these areas under any flow.

2.45 Debris: Except as otherwise permitted in this Agreement, the removal of soil, vegetation, and vegetative debris from the stream bed or stream banks is prohibited. The Permittee shall remove all human generated debris, such as yard and farm cuttings, broken concrete, construction waste, garbage and trash. The Permittee shall remove washed out culverts, and other construction materials, that the Permittee places within, or where they may enter the stream.

Diversion

2.46 Flow diversion specifications: When work in a flowing stream is unavoidable, the entire stream flow shall be diverted around the work area by a barrier, temporary culvert, new channel, or other means approved by the Department. Location of the upstream and downstream diversion points shall be approved by the Department. Construction of the barrier and/or the new channel shall normally begin in the downstream area and continue in an upstream direction, and the flow shall be diverted only when construction of the diversion is completed. Channel bank or barrier construction shall be adequate to prevent seepage into or from the work area. Diversion berms shall be constructed of onsite alluvium of low silt content, inflatable dams, sand bags, sheet pile, or other approved materials. Channel banks or barriers shall not be made of earth or other substances subject to erosion unless first enclosed by sheet piling, rock rip-rap, or other protective material. The enclosure and the supportive material shall be removed when the work is completed and removal shall normally proceed from downstream in an upstream direction. The Permittee shall obtain all written approvals from the Department prior to initiation of construction activities. The Department will have up to 30 days to review all plans.

2.47 Flows through diversions: Flow diversions shall be done in a manner that shall prevent pollution and/or siltation and which shall provide flows to downstream reaches. Flows to downstream reaches shall be provided during all times that the natural flow would have supported aquatic life. Said flows shall be sufficient quality and quantity,

and of appropriate temperature to support fish and other aquatic life below the diversion and the flows shall meet or exceed baseline conditions. Baseline conditions shall be established prior to construction and monitored upstream of any work area. Normal flows shall be restored to the affected stream immediately upon completion of work at that location.

Exotic species control

2.48 Non-native plant removal: The Permittee shall remove any non-native vegetation (tree tobacco, castor bean, giant cane, cape ivy, periwinkle, etc.) from the work area and shall dispose of it in a manner and a location which prevents its reestablishment. Removal shall be done at least twice annually during the spring/summer season, as needed, through the term of restoration. Giant cane (*Arundo*), if present, shall be cut to a height of 6 inches or less, and the stumps painted with an herbicide approved for aquatic use within 5 minutes of cutting. Herbicides shall be applied at least three times during the period from May 1 to October 1 to eradicate these plants. Where proposed methods for removing giant cane deviate from this procedure, the Permittee shall present the alternate methods, in writing, to the Department for review and approval, prior to construction.

2.49 Herbicide use: Whenever possible, invasive species shall be removed by hand or by hand-operated power tools rather than by chemical means. Where control of non-native vegetation is required within the bed, bank, or channel of the stream, the use of herbicides is necessary, and there is a possibility that the herbicides could come into contact with water, the Permittee shall employ only those herbicides, such as Rodeo/Aquamaster (Glyphosate), which are approved for aquatic use. If surfactants are required, they shall be restricted to non-ionic chemicals, such as Agri-Dex, which are approved for aquatic use. All sprays shall contain a dye to prevent overspray. No sprays shall be used when wind speed exceeds 5 mph.

2.50 Non-native wildlife: The Permittee shall remove all non-native aquatic animals from the work area, as part of the restoration of the site. Target animals include bullfrog, African clawed frog, non-native turtles, and crayfish. Compliance with this condition may be subject to a sport fishing license from the Department.

Maintenance

2.51 Clearing structures and devices: The Permittee may remove vegetation and debris, including sediment and rocks, which directly interfere with the proper function and operation of existing devices, to include the oxbow bypass culverts, pilot channel, repair of vertical walls and riprap, bridges, or that which must be removed to repair said devices or to replace them in their existing locations. Where vehicles are required to do this work, removal shall not extend more than 12 feet in any direction from said device. Where vehicles are not required, removal shall not extend more than 6 feet in any direction from said device. The stream bed and stream banks are not considered

devices", for purposes of this provision.

2.52 Maintenance may occur when sedimentation or debris in any given reach, exceeds 15% of the flow capacity. After any maintenance, the restored pilot channel shall deliberately follow whatever course the creek had imposed on the original alignment.

2.52 All maintenance shall be done when flows are at the seasons lowest, or under a flood emergency. A biological monitor shall be on site for any maintenance activities.

2.53 All or any repairs made to structures, shall be of the same design and location. If the Applicant requires any changes to the design, the Department shall be notified and shall have approval of any changes.

3. Compensatory Measures

To compensate for adverse impacts to fish and wildlife resources identified above that cannot be avoided or minimized, Permittee shall implement each measure listed below.

3.1 Mitigation for permanent disturbance: The Applicant shall not have any new permanent impacts to 9.45 acres of Mission Creek. The project is designed to remove concrete banks and bottom to increase habitat and fish passage.

3.2 Mitigation for areas of temporary disturbance: The Applicant has designed mitigation into the project and the Department considers this a self mitigating project for the entire 9.45 acres.

4. Reporting Measures

Permittee shall meet each reporting requirement described below.

4.1 Annual report: An annual report shall be submitted to the Department by Jan. 1 of each year for 5 years after planting. This report shall include the survival, % cover, and height by species of both trees and shrubs. The number by species of plants replaced, an overview of the revegetation and exotic plant control efforts, and the method used to assess these parameters shall also be included. Photos from designated photo stations shall be included.

4.2 Final report: Permittee shall provide a final construction report to DFG no later than two weeks after the project is fully completed. The construction report at a minimum shall contain total impact areas, number of trees removed or damaged, if any spills occurred, mortality of any species, and if any species were relocated.

CONTACT INFORMATION

Any communication that Permittee or DFG submits to the other shall be in writing and any communication or documentation shall be delivered to the address below by U.S. mail, fax, or email, or to such other address as Permittee or DFG specifies by written notice to the other.

To Permittee:

Seth Shank
Santa Barbara Flood Control
123 E. Anapamu Street
Santa Barbara, CA 93101
sshank@cosbpw.net

cc:
To DFG:

Department of Fish and Game
South Coast Region

Attn: Lake and Streambed Alteration Program – Natasha Lohmus
Notification #1600-2009-0370-R5
805-684-6281
nlohmus@dfg.ca.gov

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute DFG's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

DFG may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before DFG suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before DFG suspends or revokes the

Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused DFG to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes DFG from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects DFG's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC Sections 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

DFG may amend the Agreement at any time during its term if DFG determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by DFG and Permittee. To request an amendment, Permittee shall submit to DFG a completed DFG “Request to Amend Lake or Streambed Alteration” form and include with the completed form payment of the corresponding amendment fee identified in DFG’s current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter DFG approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC Section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to DFG a completed DFG "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). DFG shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (Fish & G. Code, § 1605, subd. (f)). .

EFFECTIVE DATE

The Agreement becomes effective on the date of DFG's signature, which shall be: 1) after Permittee's signature; 2) after DFG complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC Section 711.4 filing fee listed at http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement shall expire on 12/1/2013, unless it is terminated or extended before then. All provisions in the Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC Section 1605(a)(2) requires.

EXHIBITS

The documents listed below are included as exhibits to the Agreement and incorporated herein by reference.

"Santa Barbara County Streams-Lower Mission Creek Feasibility Study": Final EIS/EIR, dated September 2000, prepared by prepared by the US Army Corp of Engineers.

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify DFG in accordance with FGC Section 1602.

CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR [INSERT NAME OF PERMITTEE]

_____ _____

[Name] Date

[Title]

FOR DEPARTMENT OF FISH AND GAME

_____ _____

[Name] Date

[Title (EPM or RM)]

Prepared by: Natasha Lohmus
Environmental Scientist

APPENDIX 10

LMC Current Cost Engineering Report

US Army Corps of Engineers
Los Angeles District

Lower Mission Creek – Current Design
Santa Barbara, CA

COST ENGINEERING REPORT

October 2011

TETRA TECH

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C Tentative Project Schedule

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E Estimated Production Rates

F Phone Logs and Emails

G MCACES Construction Cost Estimates

**** TOTAL PROJECT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA

DISTRICT: Los Angeles District
POC: John Lei

PREPARED: 25-Oct-11

This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

Estimate Prepared: 31-Aug-11
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Spent Thru: 1-Oct-12 ($K)	COST ($K)	CNTG ($K)	FULL ($K)
				-		-							-
09	CHANNELS & CANALS	41,965	6,293	15%	48,258	0.5%	42,164	6,324	48,488	1,502	44,830	6,724	53,056
	CONSTRUCTION ESTIMATE TOTALS:	41,965	6,293		48,258		42,164	6,324	48,488	1,502	44,830	6,724	53,056
01	LANDS AND DAMAGES	16,377	2,457	15%	18,833	2.8%	16,829	2,524	19,353		16,377	2,457	18,833
30	PLANNING, ENGINEERING & DESIGN	4,198	633	15%	4,831	0.7%	4,227	633	4,860	2,744	4,494	669	7,907
31	CONSTRUCTION MANAGEMENT	2,519	379	15%	2,898	0.8%	2,538	380	2,918		2,911	437	3,348
	PROJECT COST TOTALS:	65,058	9,762	15%	74,820		65,758	9,861	75,619	4,246	68,612	10,287	**83,144**

CHIEF, COST ENGINEERING, Mike Newnam

Project Management, Tawny Tran

CHIEF, REAL ESTATE, Theresa Kaplan

CHIEF, ENGINEERING, Richard Leifield

ESTIMATED FEDERAL COST:	**41,572**
ESTIMATED NON-FEDERAL COST:	**41,572**
ESTIMATED TOTAL PROJECT COST:	**83,144**

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA
This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

DISTRICT: Los Angeles District
POC: John Lei
PREPARED: 25-Oct-11

Estimate Prepared: 2011(Jul - Sep)
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Contract #1 - Reach 1A (Phase 1 and Phase 2)]													
				15%										
09	CHANNELS & CANALS	5,573	836	15%	6,409	0.5%	5,599	840	6,439	2012Q3	0.8%	5,644	847	6,491
	CONSTRUCTION ESTIMATE TOTALS:	5,573	836	15%	6,409		5,599	840	6,439			5,644	847	6,491
01	LANDS AND DAMAGES	1,966	295	15%	2,261	2.8%	2,020	303	2,323	2011Q4	-2.7%	1,966	295	2,261
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	111	17	15%	128	0.8%	112	17	129	2011Q4		112	17	129
1.0%	Planning & Environmental Compliance	56	8	15%	64	0.8%	56	8	64	2011Q4		56	8	64
5.0%	Engineering & Design	279	42	15%	321	0.8%	281	42	323	2011Q4		281	42	323
0.5%	Engineering Tech Review ITR & VE	28	4	15%	32	0.8%	28	4	32	2011Q4		28	4	32
0.5%	Contracting	28	4	15%	32	0.8%	28	4	32	2011Q4		28	4	32
1.0%	Engineering During Construction	56	8	15%	64	0.8%	56	8	64	2012Q3	1.8%	57	8	65
	Planning During Construction			15%										
	Project Operation			15%										
			PED Subtotal:		641		PED Subtotal:		644			PED Subtotal:		645
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	334	50	15%	384	0.8%	337	50	387	2012Q3	1.8%	343	51	394
	Project Operation:			15%										
	Project Management			15%										
	CONTRACT COST TOTALS:	8,430	1,264		9,694		8,517	1,276	9,793			8,515	1,276	**9,791**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				4,847				4,897 #					4,896
50.0%	**NON-FEDERAL COSTS TOTALS:**				4,847				4,896 #					4,895

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA
This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

DISTRICT: Los Angeles District
POC: John Lei

PREPARED: 25-Oct-11

Estimate Prepared: 2011(Jul - Sep)
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Contract #2 - Reach 1B													
				15%										
09	CHANNELS & CANALS	4,515	677	15%	5,192	0.5%	4,537	680	5,217	2012Q4	1.2%	4,592	688	5,280
	CONSTRUCTION ESTIMATE TOTALS:	4,515	677	15%	5,192		4,537	680	5,217			4,592	688	5,280
01	LANDS AND DAMAGES	1,426	214	15%	1,640	2.8%	1,466	220	1,686	2011Q4	-2.7%	1,427	214	1,641
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	90	14	15%	104	0.8%	91	14	105	2011Q4		91	14	105
1.0%	Planning & Environmental Compliance	45	7	15%	52	0.8%	45	7	52	2011Q4		45	7	52
5.0%	Engineering & Design	226	34	15%	260	0.8%	228	34	262	2011Q4		228	34	262
0.5%	Engineering Tech Review ITR & VE	23	3	15%	26	0.8%	23	3	26	2011Q4		23	3	26
0.5%	Contracting	23	3	15%	26	0.8%	23	3	26	2011Q4		23	3	26
1.0%	Engineering During Construction	45	7	15%	52	0.8%	45	7	52	2012Q4	2.9%	46	7	53
	Planning During Construction			15%										
	Project Operation			15%										
			PED Subtotal:		520		PED Subtotal:		523			PED Subtotal:		524
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	271	41	15%	312	0.8%	273	41	314	2012Q4	2.9%	281	42	323
	Project Operation:			15%										
	Project Management			15%										
	CONTRACT COST TOTALS:	6,664	1,000		7,664		6,731	1,009	7,740			6,756	1,012	**7,768**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				3,832				3,870 #					3,884
50.0%	**NON-FEDERAL COSTS TOTALS:**				3,832				3,870 #					3,884

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA
This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

DISTRICT: Los Angeles District
POC: John Lei

PREPARED: 25-Oct-11

Estimate Prepared: 2011(Jul - Sep)
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Contract #3 - Reach 2A													
				15%										
09	CHANNELS & CANALS	1,363	204	15%	1,567	0.5%	1,369	205	1,574	2013Q3	2.5%	1,404	210	1,614
	CONSTRUCTION ESTIMATE TOTALS:	1,363	204	15%	1,567		1,369	205	1,574			1,404	210	1,614
01	LANDS AND DAMAGES	2,890	433	15%	3,323	2.8%	2,970	445	3,415	2012Q2		2,970	445	3,415
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	27	4	15%	31	0.8%	27	4	31	2012Q2	0.8%	27	4	31
1.0%	Planning & Environmental Compliance	14	2	15%	16	0.8%	14	2	16	2012Q2	0.8%	14	2	16
5.0%	Engineering & Design	68	10	15%	78	0.8%	69	10	79	2012Q2	0.8%	70	10	80
0.5%	Engineering Tech Review ITR & VE	7	1	15%	8	0.8%	7	1	8	2012Q2	0.8%	7	1	8
0.5%	Contracting	7	1	15%	8	0.8%	7	1	8	2012Q2	0.8%	7	1	8
1.0%	Engineering During Construction	14	2	15%	16	0.8%	14	2	16	2013Q3	6.0%	15	2	17
	Planning During Construction			15%										
	Project Operation			15%										
			PED Subtotal:		157		PED Subtotal:		158			PED Subtotal:		160
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	82	12	15%	94	0.8%	83	12	95	2013Q3	6.0%	88	13	101
	Project Operation:			15%										
	Project Management			15%										
	CONTRACT COST TOTALS:	4,471	669		5,141		4,560	682	5,242			4,602	688	**5,290**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				2,570				2,621 #					2,645
50.0%	**NON-FEDERAL COSTS TOTALS:**				2,571				2,621 #					2,645

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA
This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

DISTRICT: Los Angeles District
POC: John Lei
PREPARED: 25-Oct-11

Estimate Prepared: 2011(Jul - Sep)
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Contract #4 - Reach 2B													
				15%										
09	CHANNELS & CANALS	3,835	575	15%	4,410	0.5%	3,853	578	4,431	2013Q3	2.5%	3,951	593	4,544
	CONSTRUCTION ESTIMATE TOTALS:	3,835	575	15%	4,410		3,853	578	4,431			3,951	593	4,544
01	LANDS AND DAMAGES	4,381	657	15%	5,038	2.8%	4,502	675	5,177	2012Q2		4,502	675	5,177
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	77	12	15%	89	0.8%	78	12	90	2012Q2	0.8%	79	12	91
1.0%	Planning & Environmental Compliance	38	6	15%	44	0.8%	38	6	44	2012Q2	0.8%	38	6	44
5.0%	Engineering & Design	192	29	15%	221	0.8%	194	29	223	2012Q2	0.8%	196	29	225
0.5%	Engineering Tech Review ITR & VE	19	3	15%	22	0.8%	19	3	22	2012Q2	0.8%	19	3	22
0.5%	Contracting	19	3	15%	22	0.8%	19	3	22	2012Q2	0.8%	19	3	22
1.0%	Engineering During Construction	38	6	15%	44	0.8%	38	6	44	2013Q3	6.0%	40	6	46
	Planning During Construction			15%										
	Project Operation			15%										
			PED Subtotal:		442		PED Subtotal:		445			PED Subtotal:		450
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	230	35	15%	265	0.8%	232	35	267	2013Q3	6.0%	246	37	283
	Project Operation:			15%										
	Project Management			15%										
	CONTRACT COST TOTALS:	8,828	1,326		10,154		8,973	1,347	10,320			9,090	1,364	**10,454**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				5,077				5,160 #					5,227
50.0%	**NON-FEDERAL COSTS TOTALS:**				5,077				5,160 #					5,227

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA
This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

DISTRICT: Los Angeles District
POC: John Lei

PREPARED: 25-Oct-11

Estimate Prepared: 2011(Jul - Sep)
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Contract #5 - Reach 03													
				15%										
09	CHANNELS & CANALS	2,681	402	15%	3,083	0.5%	2,693	404	3,097	2014Q4	4.7%	2,820	423	3,243
	CONSTRUCTION ESTIMATE TOTALS:	2,681	402	15%	3,083		2,693	404	3,097			2,820	423	3,243
01	LANDS AND DAMAGES	648	97	15%	745	2.8%	666	100	766	2014Q3	5.4%	702	105	807
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	54	8	15%	62	0.8%	54	8	62	2014Q3	10.2%	59	9	68
1.0%	Planning & Environmental Compliance	27	4	15%	31	0.8%	27	4	31	2014Q3	10.2%	30	4	34
5.0%	Engineering & Design	134	20	15%	154	0.8%	135	20	155	2014Q3	10.2%	149	22	171
0.5%	Engineering Tech Review ITR & VE	13	2	15%	15	0.8%	13	2	15	2014Q3	10.2%	14	2	16
0.5%	Contracting	13	2	15%	15	0.8%	13	2	15	2014Q3	10.2%	14	2	16
1.0%	Engineering During Construction	27	4	15%	31	0.8%	27	4	31	2014Q4	11.2%	30	4	34
	Planning During Construction			15%										
	Project Operation			15%										
			PED Subtotal:		308		PED Subtotal:		309			PED Subtotal:		339
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	161	24	15%	185	0.8%	162	24	186	2014Q4	11.2%	180	27	207
	Project Operation:			15%										
	Project Management			15%										
	CONTRACT COST TOTALS:	3,757	563		4,320		3,790	568	4,358			3,998	598	**4,596**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				2,160				2,179 #					2,298
50.0%	**NON-FEDERAL COSTS TOTALS:**				2,160				2,179 #					2,298

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA
This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

DISTRICT: Los Angeles District
POC: John Lei

PREPARED: 25-Oct-11

Estimate Prepared: 2011(Jul - Sep)
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Contract #6 - Reach 04													
				15%										
09	CHANNELS & CANALS	4,994	749	15%	5,743	0.5%	5,018	753	5,771	2015Q4	6.5%	5,344	802	6,146
	CONSTRUCTION ESTIMATE TOTALS:	4,994	749	15%	5,743		5,018	753	5,771			5,344	802	6,146
01	LANDS AND DAMAGES	2,585	388	15%	2,973	2.8%	2,657	399	3,056	2013Q2	2.7%	2,728	410	3,138
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	100	15	15%	115	0.8%	101	15	116	2013Q2	5.0%	106	16	122
1.0%	Planning & Environmental Compliance	50	8	15%	58	0.8%	50	8	58	2013Q2	5.0%	52	8	60
5.0%	Engineering & Design	250	38	15%	288	0.8%	252	38	290	2013Q2	5.0%	264	40	304
0.5%	Engineering Tech Review ITR & VE	25	4	15%	29	0.8%	25	4	29	2013Q2	5.0%	26	4	30
0.5%	Contracting	25	4	15%	29	0.8%	25	4	29	2013Q2	5.0%	26	4	30
1.0%	Engineering During Construction	50	8	15%	58	0.8%	50	8	58	2015Q4	15.4%	58	9	67
	Planning During Construction			15%										
	Project Operation			15%										
			PED Subtotal:		577		PED Subtotal:		580			PED Subtotal:		613
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	300	45	15%	345	0.8%	302	45	347	2015Q4	15.4%	348	52	400
	Project Operation:			15%										
	Project Management			15%										
	CONTRACT COST TOTALS:	8,380	1,259		9,639		8,480	1,274	9,754			8,952	1,345	**10,297**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				4,819				4,877 #					5,149
50.0%	**NON-FEDERAL COSTS TOTALS:**				4,820				4,877 #					5,148

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA
This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

DISTRICT: Los Angeles District
POC: John Lei

PREPARED: 25-Oct-11

Estimate Prepared: 2011(Jul - Sep)
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Contract #7 - Reach 05													
				15%										
09	CHANNELS & CANALS	6,611	992	15%	7,603	0.5%	6,643	997	7,640	2016Q4	8.3%	7,195	1,080	8,275
	CONSTRUCTION ESTIMATE TOTALS:	6,611	992	15%	7,603		6,643	997	7,640			7,195	1,080	8,275
01	LANDS AND DAMAGES	920	138	15%	1,058	2.8%	945	142	1,087	2013Q4	2.7%	970	146	1,116
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	132	20	15%	152	0.8%	133	20	153	2013Q4	7.0%	142	21	163
1.0%	Planning & Environmental Compliance	66	10	15%	76	0.8%	67	10	77	2013Q4	7.0%	72	11	83
5.0%	Engineering & Design	331	50	15%	381	0.8%	334	50	384	2013Q4	7.0%	358	54	412
0.5%	Engineering Tech Review ITR & VE	33	5	15%	38	0.8%	33	5	38	2013Q4	7.0%	35	5	40
0.5%	Contracting	33	5	15%	38	0.8%	33	5	38	2013Q4	7.0%	35	5	40
1.0%	Engineering During Construction	66	10	15%	76	0.8%	67	10	77	2016Q4	19.6%	80	12	92
	Planning During Construction			15%										
	Project Operation			15%										
			PED Subtotal:		761		PED Subtotal:		767			PED Subtotal:		830
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	397	60	15%	457	0.8%	400	60	460	2016Q4	19.6%	478	72	550
	Project Operation:			15%										
	Project Management			15%										
	CONTRACT COST TOTALS:	8,589	1,290		9,879		8,655	1,299	9,954			9,365	1,406	**10,771**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				4,940				4,977 #					5,386
50.0%	**NON-FEDERAL COSTS TOTALS:**				4,939				4,977 #					5,385

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA
This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

DISTRICT: Los Angeles District
POC: John Lei

PREPARED: 25-Oct-11

Estimate Prepared: 2011(Jul - Sep)
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Contract #8 - Reach 06													
				15%										
09	CHANNELS & CANALS	5,110	766	15%	5,876	0.5%	5,134	770	5,904	2017Q4	10.3%	5,663	849	6,512
	CONSTRUCTION ESTIMATE TOTALS:	5,110	766	15%	5,876		5,134	770	5,904			5,663	849	6,512
01	LANDS AND DAMAGES	521	78	15%	599	2.8%	535	80	615	2014Q2	5.4%	564	84	648
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	102	15	15%	117	0.8%	103	15	118	2014Q2	9.1%	112	16	128
1.0%	Planning & Environmental Compliance	51	8	15%	59	0.8%	51	8	59	2014Q2	9.1%	56	9	65
5.0%	Engineering & Design	255	38	15%	293	0.8%	257	38	295	2014Q2	9.1%	280	41	321
0.5%	Engineering Tech Review ITR & VE	26	4	15%	30	0.8%	26	4	30	2014Q2	9.1%	28	4	32
0.5%	Contracting	26	4	15%	30	0.8%	26	4	30	2014Q2	9.1%	28	4	32
1.0%	Engineering During Construction	51	8	15%	59	0.8%	51	8	59	2017Q4	23.9%	63	10	73
	Planning During Construction			15%										
	Project Operation			15%										
			PED Subtotal:		588		PED Subtotal:		591			PED Subtotal:		651
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	307	46	15%	353	0.8%	309	46	355	2017Q4	23.9%	383	57	440
	Project Operation:			15%										
	Project Management			15%										
	CONTRACT COST TOTALS:	6,448	967		7,416		6,492	973	7,465			7,177	1,074	**8,251**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				3,708				3,733 #					4,126
50.0%	**NON-FEDERAL COSTS TOTALS:**				3,708				3,732 #					4,125

**** TOTAL PROJECT COST SUMMARY ****

**** CONTRACT COST SUMMARY ****

PROJECT: Lower Mission Creek Flood Control
LOCATION: Santa Barbara, CA
This Estimate reflects the scope and schedule in feasibility report; Lower Mission Creek DDR

DISTRICT: Los Angeles District
POC: John Lei
PREPARED: 25-Oct-11

Estimate Prepared: 2011(Jul - Sep)
Effective Price Level: 1-Oct-12

Program Year (Budget EC): 2012
Effective Price Level Date: 1 OCT 11

FULLY FUNDED PROJECT ESTIMATE

WBS NUMBER	Civil Works Feature & Sub-Feature Description	COST ($K)	CNTG ($K)	CNTG (%)	TOTAL ($K)	ESC (%)	COST ($K)	CNTG ($K)	TOTAL ($K)	Mid-Point Date	ESC (%)	COST ($K)	CNTG ($K)	FULL ($K)
	Contract #9 - Reach 07													
				15%										
09	CHANNELS & CANALS	7,283	1,092	15%	8,375	0.5%	7,318	1,097	8,415	2018Q4	12.3%	8,217	1,232	9,449
	CONSTRUCTION ESTIMATE TOTALS:	7,283	1,092	15%	8,375		7,318	1,097	8,415			8,217	1,232	9,449
01	LANDS AND DAMAGES	1,041	156	15%	1,197	2.8%	1,069	160	1,229	2014Q4	5.4%	1,126	169	1,295
30	PLANNING, ENGINEERING & DESIGN													
2.0%	Project Management	146	22	15%	168	0.8%	147	22	169	2014Q4	11.2%	163	24	187
1.0%	Planning & Environmental Compliance	73	11	15%	84	0.8%	74	11	85	2014Q4	11.2%	82	12	94
5.0%	Engineering & Design	364	55	15%	419	0.8%	367	55	422	2014Q4	11.2%	408	61	469
0.5%	Engineering Tech Review ITR & VE	36	5	15%	41	0.8%	36	5	41	2014Q4	11.2%	40	6	46
0.5%	Contracting	36	5	15%	41	0.8%	36	5	41	2014Q4	11.2%	40	6	46
1.0%	Engineering During Construction	73	11	15%	84	0.8%	74	11	85	2018Q4	28.1%	95	14	109
	Planning During Construction			15%										
	Project Operation			15%										
			PED Subtotal:		837		PED Subtotal:		843			PED Subtotal:		951
31	CONSTRUCTION MANAGEMENT													
6.0%	Construction Management	437	66	15%	503	0.8%	440	67	507	2018Q4	28.1%	564	86	650
	Project Operation:			15%										
	Project Management			15%										
	CONTRACT COST TOTALS:	9,489	1,423		10,912		9,561	1,433	10,994			10,735	1,610	**12,345**
COST SPLIT														
50.0%	**FEDERAL COST TOTALS:**				5,456				5,497 #					6,173
50.0%	**NON-FEDERAL COSTS TOTALS:**				5,456				5,497 #					6,172

LOWER MISSION CREEK FLOOD CONTROL

COST ESTIMATE NARRATIVE

1. Project Description

A. General: This work is in support of the design of flood control improvements along the lower reach of Mission Creek in Santa Barbara, CA. The lower reach of Mission Creek consists of the last one mile of the creek, prior to it reaching the Pacific Ocean. The proposed improvements would increase the channel capacity to 3,400-cfs and would provide approximately a 20-year level of protection against flooding. The natural bottom of the creek channel would be maintained, while vertical walls and vegetated riprap side slopes would be constructed.

B. Purpose: The purpose of this work is to develop detailed cost estimates – consistent to the level of design – for the cost and quantities of the construction features using Micro-Computer Aided Cost Estimating System (MCACES).

C. Design Features: Construction features include soldier piles; concrete walls; riprap and boulder clusters; fencing; geotextile fabric; gravel fill; excavation and fill; weep holes and drainage piping; native plantings and irrigation.

2. Basis of Estimate

a. Basis of Design: Available design documents of the project elements are listed below. The project site plan is presented in Appendix A.

- Lower Mission Creek Reaches 1B and 3-7 Design Documentation Report, Prepared by Tetra Tech, dated July, 2011
- Lower Mission Creek Reach 1B and 3-7 Design Drawings, July 2011

A. Basis of Quantities: The cost estimate is based on project quantity take-offs that have been calculated from the documents listed above. A quantity summary along with detailed quantity take-offs are presented in Appendix B. The detailed quantities include waste/loss factors for the project materials as listed below:

Soil Swell/Shrinkage Factor	15%
Over Excavation	3%
Riprap Overplace	15%
Filter Fabric Waste	5%
Concrete Overplace	10%

3. Construction Schedule

It is estimated that overall construction would take approximately seven years. This duration has been used in the estimate to determine costs for the contractor to maintain

field facilities and construction supervision. A simplified tentative project schedule of the overall project is presented in Appendix C. The overall schedule is based on the following reasoning and assumptions:

- Typical construction, crew (1 shift) working 10hrs per day and 6 days per week.
- Due to the limited yearly work periods from environmental constraints, the work is expected to utilize overtime in the construction phase for all work items.
- One reach would be constructed per year, while attempting to not do any work during the wet period between mid November and the beginning of March.

4. Acquisition Plan

The cost estimate is based on a single contract being awarded for each reach. Each contract would have a Prime Contractor with subcontractors for the vegetative aspects, concrete placing, fencing, pile driving and drilling caisson holes. The prime contractors would be responsible for the preparatory work, channel excavation, and all associated site work as well as overseeing the subcontractors' work on the soldier pile installation, fencing, concrete placing, sheet piling and landscaping.

5. Project Construction

A. Staging and Site Access: Each reach would have its own staging and site access areas. They would be located in an appropriate area designated on the design drawings.

B. Borrow/Disposal Areas and Materials: The borrow materials for placement of riprap, boulders and gravel sub base are available nearby and would be trucked in from the Bee Rock Quarry in Santa Ynez.

The materials required for the cast-in-place concrete mixes including cement, coarse aggregate, fine aggregate, and various admixtures would be locally available.

The materials for structural concrete placement and construction including steel reinforcing are assumed to be available locally and within the greater Los Angeles area and would be shipped to the site.

All materials that need to be disposed of off-site are assumed to be loaded and hauled to the South Coast Recycling & Transfer Station which is located in Santa Barbara. This recycling center is located approximately 12-miles from the project site. This station would be able to take in the excess excavated material as well as any demolished material that would be removed during construction.

C. Construction Methodology:

1) Reach 1A – Mason Street Bridge to Yanonali Street Bridge

This reach would be constructed in two phases. The construction costs for each phase were estimated by Dean Ryan Consultants & Designers. Only the construction costs for the two phases are included in the Total Project Cost Summary (TPCS). The cost estimates provided were prepared in August 2010

dollars (4Q10) and were escalated to August 2011 prices (4Q11). The original estimated costs for this reach is $5,504,376 and the escalated cost that is used in the TPCS is $5,572,508.

2) Reach 1B – Mason Street Bridge to Yanonali Street Bridge

   This reach stretches from the Mason Street Bridge on the downstream side to the Yanonali Street Bridge on the upstream side. Dewatering of the channel would occur in two phases. Sheet piles would be driven along the channel center line to and at both ends of the reach, one side would be enclosed with sheet piles. The water would be pumped out of the enclosed half of the channel while construction on that side occurs. After construction is finished for the first side of the channel, the sheet piles at both ends of the cofferdam would be removed and replaced on the opposite side of the channel. Then the second side would have the water pumped out and construction could occur.

   After dewatering several structures would need to be removed, which include gabion boxes, miscellaneous concrete structures, and concrete bags. The channel would be excavated to the designed invert elevation. The channel walls required is this reach would consist of type D-1 walls. These walls would be constructed with soldier piles. The soldier piles would require drilling of 30-inch diameter holes. I-beams would then be placed in the holes and filled with concrete to the level designated by the wall type. Timber lagging would be placed into the exposed I-beams as the material in the wall's path is excavated out. After the lagging is in place, the reinforced concrete wall would be poured, with a drainage mat placed in between the wall and the lagging. PVC weep holes would also be placed into the concrete for water to exit from the drainage material.

   This reach would require the placement of riprap at the toe revetment of the concrete wall in some areas. The riprap would have a filter material and a layer of gravel placed beneath it. Several boulder clusters would also be required to dissipate some of the creeks energy. A reinforced concrete fish ledge would also be installed on the north wall in one section. There would also be a reinforced concrete gutter installed outside of the channel along the entire length of where the walls are constructed.

3) Reach 2A – This reach would consist of a double cell reinforced concrete box culvert. The area where the culvert would be placed would require excavation and a gravel base. Two catch basins would also be required in this reach, along with a length of 24-inch RCP. Both a concrete curb and asphalt concrete pavement would be demolished and then replaced at the end of construction. Shrubs and grasses would also be planted on site.

4) Reach 2B – Bypass Culvert – Upstream Railroad to Diversion Structure

   This reach's quantities were taken from an estimate created by HDR, Inc.

5) Reach 3 – Highway 101 to Gutierrez Street Bridge

   This reach is bound by Highway 101 on the downstream end and the Gutierrez Street Bridge on the upstream end. At the onset of construction for this reach several existing structures would need to be demolished. Those construction

items to be demolished would consist of riprap, grouted rock, and miscellaneous concrete. A 36-inch diameter HDPE pipe would be used to divert water away from where construction is taking place. The channel would then be excavated between where the concrete walls would be constructed as well as where the riprap slopes are to be placed.

The reinforced concrete channel walls would be constructed on top of steel soldier piles. The piles would require 30-inch diameter drilled holes filled with concrete and steel I-beams. Timber lagging would be placed into the exposed I-beams as the earth is excavated from the area where the concrete wall is to be placed. The height of the wall and depth of the drilled holes would be based on the design dimensions of the two types of walls required for this reach. The current design calls for both A-1 and D-1 type walls within this reach. The walls would require a drainage mat with PVC weep holes to be placed to allow for drainage. A reinforced concrete gutter would also be placed outside of the channel along the entire length of the concrete walls.

Various types of fill materials would also be required at this site. Riprap would be required to be placed for toe revetment, channel revetment, and at the drop structure. Gravel and geotextile fabric would also be placed for these construction items. A reinforced construction access road would be placed as well. The reach would also require steel safety railing.

6) Reach 4 - Gutierrez Street Bridge to Haley-De la Vina Street Bridge

This reach is bound by the Gutierrez Street Bridge on the downstream end and the Haley-De la Vina Street Bridge on the upstream end. At the onset of construction for this reach several existing structures would need to be demolished. Those construction items to be demolished would consist of riprap and miscellaneous concrete. A 36-inch diameter HDPE pipe would be used to divert water away from where construction is taking place. The channel would then be excavated between where the concrete walls would be constructed as well as where the riprap slopes are to be placed.

The reinforced concrete channel walls would be constructed on top of steel soldier piles. The piles would require 30-inch diameter drilled holes filled with concrete and steel I-beams. Timber lagging would be placed into the exposed I-beams as the earth is excavated from the area where the concrete wall is to be placed. The height of the wall and depth of the drilled holes would be based on the design dimensions of the various types of walls required for this reach. The current design calls for A-1, B-1, B-2, C-1 and D-1 type walls within this reach. Each type of wall would require a drainage mat with PVC weep holes to be placed to allow for drainage. A concrete gutter would also be placed outside of the channel along the entire length of the concrete walls.

Several types of fill materials would also be required at this site. Riprap would be required for toe revetment, channel revetment, and at the drop structure. Gravel and geotextile fabric would also be placed for these construction items. A boulder cluster would be installed as well. The site would also have steel railing placed.

7) Reach 5 –Haley-De la Vina Street Bridge to Cota Street Bridge

This reach is bound by the Haley-De la Vina Bridge on the downstream end and the Cota Street Bridge on the upstream end. At the onset of construction for this reach several existing structures would need to be demolished. Those construction items to be demolished would consist of grouted rock, concrete bags and miscellaneous concrete. A 36-inch diameter HDPE pipe would be used to divert water away from where construction is taking place. The channel would then be excavated between where the concrete walls would be constructed as well as where the riprap slopes are to be placed.

The reinforced concrete channel walls would be constructed on top of steel soldier piles. The piles would require 30-inch diameter drilled holes filled with concrete and steel I-beams. Timber lagging would be placed into the exposed I-beams as the earth is excavated from the area where the concrete wall is to be placed. The height of the wall and depth of the drilled holes would be based on the design dimensions of the various types of walls required for this reach. The current design calls for B-2, C-2 and D-2 type walls within this reach. Each type of wall would require a drainage mat with PVC weep holes to be placed to allow for drainage. A concrete gutter would also be placed outside of the channel along the entire length of the concrete walls.

Several types of fill materials would also be required at this site. Riprap would be required for toe revetment, channel revetment, and at the drop structure. Gravel and geotextile fabric would also be placed for these construction items. A boulder cluster would be installed as well. The site would also have steel railing placed.

8) Reach 6 – Cota Street Bridge to Ortega Street Bridge

This reach is bound by the Cota Street Bridge on the downstream end and the Ortega Street Bridge on the upstream end. At the onset of construction for this reach several existing structures would need to be demolished. Those construction items to be demolished would consist of gabion boxes, riprap, grouted rock, and concrete bags. A 36-inch diameter HDPE pipe would be used to divert water away from where construction is taking place. The channel would then be excavated between where the concrete walls would be constructed as well as where the riprap slopes are to be placed.

The reinforced concrete channel walls would be constructed on top of steel soldier piles. The piles would require 30-inch diameter drilled holes filled with concrete and steel I-beams. Timber lagging would be placed into the exposed I-beams as the earth is excavated from the area where the concrete wall is to be placed. The height of the wall and depth of the drilled holes would be based on the design dimensions of the various types of walls required for this reach. The current design calls for A-2, B-2, C-2 and D-2 type walls within this reach. Each type of wall would require a drainage mat with PVC weep holes to be placed to allow for drainage. A concrete gutter would also be placed outside of the channel along the entire length of the concrete walls.

Several types of fill materials would also be required at this site. Riprap would be required for toe revetment, channel revetment, and at the drop structures. Gravel and geotextile fabric would also be placed for these construction items. A boulder cluster would be installed as well. A reinforced concrete access road would be constructed on the south side of the channel. The site would also have steel railing placed.

9) Reach 7 – Ortega Street Bridge to Canon Perdido Street Bridge

This reach is bound by the Ortega Street Bridge on the downstream end and the Canon Perdido Street Bridge on the upstream end. The De La Guerra Street Bridge runs through the middle of this reach splitting it in two. At the onset of construction for this reach several existing structures would need to be demolished. Those construction items to be demolished would consist of riprap and concrete bags. A 36-inch diameter HDPE pipe would be used to divert water away from where construction is taking place. The channel would then be excavated between where the concrete walls would be constructed as well as where the riprap slopes are to be placed.

The reinforced concrete channel walls would be constructed on top of steel soldier piles. The piles would require 30-inch diameter drilled holes filled with concrete and steel I-beams. Timber lagging would be placed into the exposed I-beams as the earth is excavated from the area where the concrete wall is to be placed. The height of the wall and depth of the drilled holes would be based on the design dimensions of the various types of walls required for this reach. The current design calls for A-2, B-2, C-2 and D-2 type walls within this reach. Each type of wall would require a drainage mat with PVC weep holes to be placed to allow for drainage. A concrete gutter would also be placed outside of the channel along the entire length of the concrete walls.

Several types of fill materials would also be required at this site. Riprap would be required for toe revetment, channel revetment, and at the drop structures. Gravel and geotextile fabric would also be placed for these construction items. A boulder cluster would be installed in the middle of the reach, just downstream of the De la Guerra Street Bridge. A reinforced concrete access road would be constructed just downstream of the Canon Perdido Street Bridge. The site would also have steel railing placed.

D. Unusual Conditions: (Soil, Water, Weather, Traffic). Flooding within the creek and proposed interior drainage storm drain, seasonally variation in groundwater depths, varying bedrock elevations, poor soil conditions, and traffic.

E. Unique Construction Techniques: Mostly in dry creek bed with possible shallow groundwater. Drilling equipment would be necessary for the drilling of the holes for the soldier piles.

F. Equipment/Labor Availability and Distance Traveled: All equipment and labor should be available in the greater Los Angeles area.

6. Environmental Concerns

Construction activities would likely increase turbidity in the river. There is a potential for construction equipment to leak or spill contaminates into the river and or damage existing sensitive plant and wildlife.

7. Effective Dates for Labor, Equipment and Material Pricing

The labor, equipment, and material pricing were developed using the MCACES 2010 English Unit Cost Library, 2011 Los Angeles Labor Library, and the 2009 Equipment Library (Region VII) for the base cost estimates. The index pricing data has been prepared in August 2011 dollars.

The labor rates from the MCACES 2011 Los Angeles Labor Library were compared with current Davis-Bacon Wage rates General Decision County Index CA20100023 (see Appendix D). The Davis-Bacon Wage rates for Santa Barbara County were used in the estimate.

The base cost estimates have been updated with current quoted fuel prices of $3.98/gal for off-road diesel, $4.49/gal for on-road diesel and $4.31/gal for gasoline in the Santa Barbara area.

8. Estimated Production Rates

The construction of this project would require some specialty types of crews and equipment due to the unique construction techniques required for some aspects of this work. See Appendix E for the Estimated Production Rates for these specialty crews.

9. Project Markups

A. Escalation: Escalation has been calculated within the Total Project Cost Summary. Price levels have been escalated from effective price levels of the construction cost estimate for August 2011 to the mid-point of construction for each reach (contract). The appropriate escalation cost factors for each date for each feature account have been calculated within the TPCS.

B. Contingency: A 15% contingency has been included in the estimate on all construction reaches.

11. Functional Costs

Functional costs associated with this work were estimated as follows:

A. 01 Account – Lands and Damages: Costs for lands and damages were provided by the USACE, Los Angeles District. The costs came from the Lower Mission Creek Flood Control Project, Updated Real Estate Plan Report, which is dated September 29, 2011 and was prepared by William Brown.

B. 02 Account – Relocations: There are no costs for relocations included in this account. The relocation costs are accounted for in the costs for the bridge replacements, which do not fall under the scope for this estimate.

C. 30 Account - Planning, Engineering, and Design: Costs for this account were estimated at 10.0% of the construction cost. This account covers the preparation of plans, and specifications.

D. 31 Account - Construction Management: Costs for this account were estimated to be 6.0% of the construction cost. This account covers construction management during construction.

E. Sunk Costs: Costs for this were provided by the Project Manager. Costs that were included in this account on the TPCS include the total allocated costs to date ($2,744,000) and the costs for the constructed UPRR Box Culvert ($1,502,021).

12. References

U.S. Army Corps of Engineers, 1993, *Engineering and Design Cost Engineering Policy and General Requirements, Engineering Regulation 1110-1-1300,* Department of the Army, Washington D.C., 26 March 1993.

U.S. Army Corps of Engineers, 1999, *Engineering and Design For Civil Works Projects, Engineering Regulation 1110-2-1150,* Department of the Army, Washington D.C., 31 August 1999.

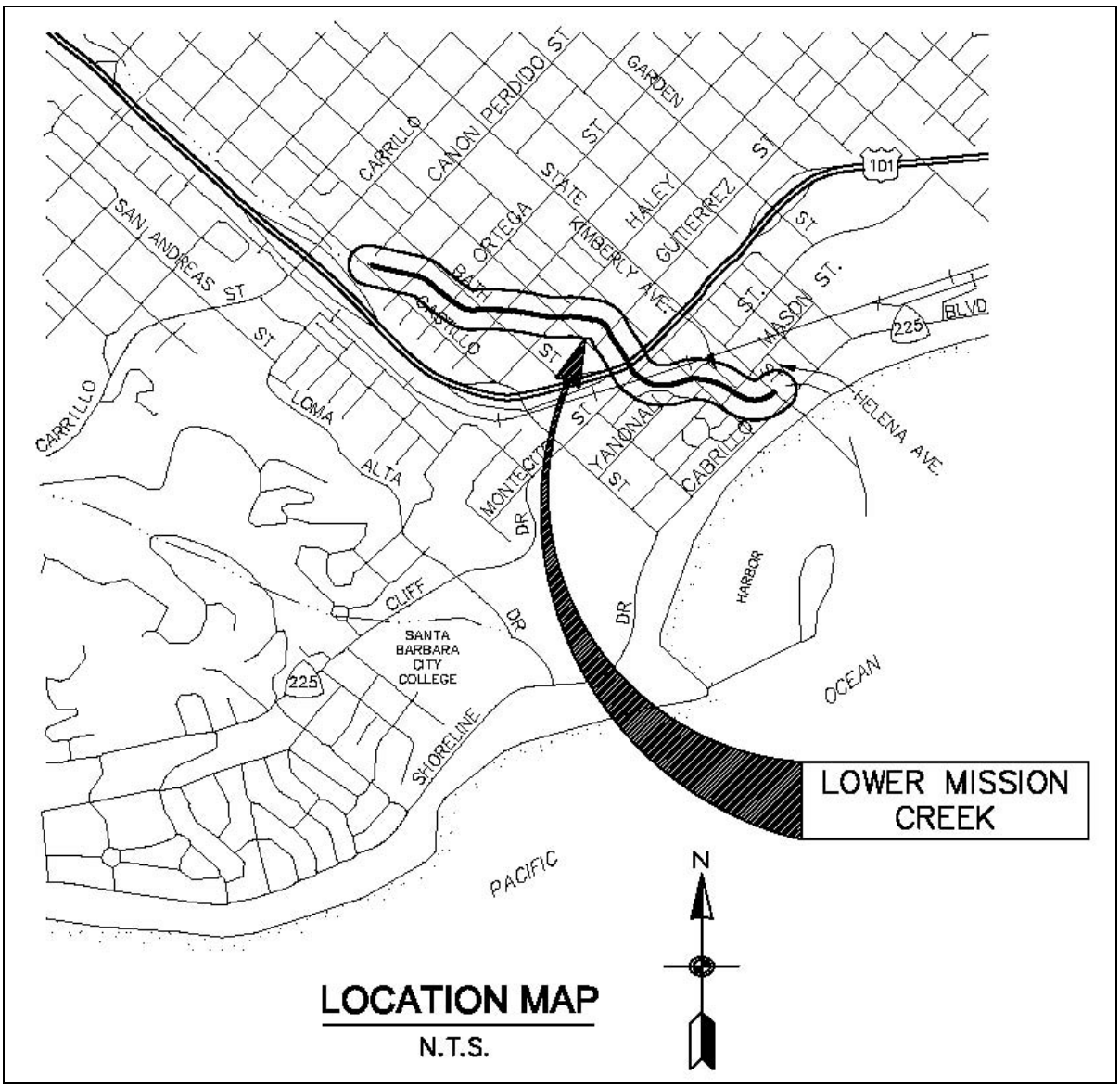
U.S. Army Corps of Engineers, 2008a, *Civil Works Cost Engineering, Engineering Regulation 1110-2-1302,* Department of the Army, Washington D.C., 15 September 2008.

U.S. Army Corps of Engineers, 2008b, *Construction Cost Estimating Guide For Civil Works, Engineering Technical Letter 1110-2-573,* Department of the Army, Washington D.C., 30 September 2008.

U.S. Army Corps of Engineers, 2010, *Civil Works Construction Cost Index System, Engineering Manual 1110-2-1304,* Department of the Army, Washington D.C., 31 September 2010.

APPENDIX A

Site Plan


CANON PERDIDO ST
GARDEN
CARRILLO
ST
STATE
HALEY
GUTIERREZ
ST
101
SAN ANDREAS ST
ORTEGA
KIMBERLY AVE.
BATH
CARRILLO
ST
ST.
MASON ST.
225
BLVD
CARRILLO
ST
LOMA
ALTA
MONTECITO
ST
YANONALI
ST
CABRILLO
HELENA AVE.
DR
CLIFF
DR
DR
HARBOR
SANTA BARBARA CITY COLLEGE
225
OCEAN
SHORELINE
LOWER MISSION CREEK
PACIFIC
N
LOCATION MAP
N.T.S.

APPENDIX B

Project Quantities and Detailed Quantity Take-Offs

Lower Mission Creek
Work Breakdown Structure

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
[09]	**CHANNELS**	-	EA	1
[1B]	**REACH 1B**	-	LS	1
[1B 00]	**Mobilization / Demobilization**	-	LS	1
[1B 01]	**Demolition**	-	LS	1
[1B 01 01]	**Demo Gabions**	-	SF	264
	Demo Gabions	-	SY	29.3
	Load Material	-	CY	29.3
	Hauling	-	LCY	59
	Tipping Fee	-	TON	44
[1B 01 04]	**Demo Concrete Slope**	-	SF	441
	Demo Concrete	-	SF	441
	Load Material	-	CY	8.2
	Hauling	-	LCY	16.3
	Tipping Fee	-	TON	12.3
[1B 01 05]	**Demo Concrete Bags**	-	SF	1,194
	Demo Concrete Bags	-	SF	1,194
	Load Material	-	CY	66.3
	Hauling	-	LCY	132.7
	Tipping Fee	-	TON	99.5
[1B 01 06]	**Demo Existing Storm Drain**	-	LF	40
	Excavation	-	CY	122
	Demo RCP	-	LF	40
	Load Material	-	CY	23.6
	Hauling	-	LCY	47
	Tipping Fee	-	TON	21.36
[1B 01 07]	**Remove / Replace Light Pole**	-	EA	1
[1B 01 07 01]	**Remove Light Pole**	-	EA	1
	Demo Light Pole	-	EA	1
	Demo Light Pole Base	-	CY	1
	Hauling	-	CY	2.0
	Tipping Fee	-	TON	1.5
[1B 02]	**Channel Grading**	-	LS	1
[1B 02 00]	**Clearing and Grubbing**	-	ACRE	0.66
	Clearing and Grubbing	-	ACRE	0.66
	Load Material	-	CY	264
	Hauling	-	LCY	264
	Tipping Fee	-	TON	132
[1B 02 01]	**Excavate (Wall to Wall)**	-	CY	6,675
	Structural Excavation	3%	BCY	6,875
	Load Material	15%	CY	7,676
	Hauling	15%	LCY	7,676
	Tipping Fee	-	TON	9,011
[1B 02 02]	**Excavate for Riprap Placement**	-	CY	782
	Excavation	3%	BCY	805
	Load Material	15%	CY	899
	Hauling	15%	LCY	899
	Tipping Fee	-	TON	1,056
[1B 02 04]	**Fill**	-	CY	62
	Structural Excavation	3%	BCY	63.9
	Compaction	-	ECY	62
	Water Truck for Compaction	-	ECY	62
[1B 03]	**Channel Wall**	-	LS	1
[1B 03 01]	**Wall Type D-1**	-	LF	796
[1B 03 01 01]	**Soldier Piles**	-	EA	81
	Caisson Pile Drilling	-	VLF	3,807
	Soldier Piles, Material	-	VLF	3,807
	Concrete, Material	10%	CY	486
	Tipping Fee	10%	CY	486
[1B 03 01 02]	**Timber Lagging**	-	MBF	78.4
	8" x 8" Timber Lagging	-	MBF	78.4
[1B 03 01 03]	**Concrete**	-	CY	1,032
	Concrete, Forms	-	SFC	11,144
	Concrete, Material	10%	CY	1,135
	Concrete, Placing	10%	CY	1,135
	Concrete, Form Liner	-	SF	11,144
[1B 03 01 04]	**Reinforcing Steel**	-	TON	77.4
	Reinforcing Steel	-	TON	77.4
	Steel Shop Handling	-	TON	77.4
	Steel Unload and Sort	-	TON	77.4
[1B 03 01 05]	**Drainage Mat**	-	SF	11,144
	Geotextile Drainage Mat	-	SF	11,144
[1B 03 01 06]	**Weep Holes**	-	EA	81
	3" PVC Pipe	-	LF	162
	3" Steel Grate	-	EA	81
[1B 03 01 07]	**Underdrain Pipe**	-	LF	796
	6" Perforated PVC Pipe	-	LF	796
	Base Course	15%	CY	78
	Geotextile Fabric	5%	SY	604
[1B 04]	**Fill Material**	-	LS	1
[1B 04 01]	**Riprap**	-	TON	818
[1B 04 01 01]	**Toe Revetment Riprap**	-	TON	818
	Riprap	15%	TON	941
[1B 04 02]	**Gravel**	-	TON	355
[1B 04 02 01]	**Toe Revetment Gravel**	-	TON	355
	Gravel	15%	TON	408

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MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
[1B 04 03]	**Filter Material**	**-**	**SY**	**873**
[1B 04 03 01]	**Toe Revetment Geotextile**	**-**	**SY**	**873**
	Geotextile Fabric	5%	SY	917
[1B 05]	**Boulder Cluster**	**-**	**EA**	**2**
	Boulder Cluster	-	**TON**	66
[1B 07]	**Fencing**	**-**	**LS**	**1**
[1B 07 01]	**Safety Fence**	**-**	**LF**	**716**
	Railing	-	LF	716
[1B 09]	**Landscaping**	**-**	**LS**	**1**
	24" Box Trees	-	EA	1
	Landscape Area	-	SF	1,251
	Irrigation	-	SF	1,251
	Landscape Maintenance	-	SF	1,251
[1B 10]	**Fish Ledge**	**-**	**LF**	**110**
	Concrete, Forms	-	SFC	231
	Concrete, Material	10%	CY	3.7
	Concrete, Placing	10%	CY	3.7
	Reinforcing Steel	-	TON	0.25
[1B 11]	**Reinforced Gutter**	**-**	**LF**	**796**
	Concrete, Forms	-	SFC	332
	Concrete, Material	10%	CY	16.9
	Concrete, Placing	10%	CY	16.9
	Reinforcing Steel	-	TON	1.25
[1B 12]	**Construct 54" RCP**	**-**	**LF**	**40**
	Bedding Material	15%	CY	9
	54" RCP	-	LF	40
	Backfill from Stockpile	-	CY	109
	Compaction	-	ECY	95
	Water Truck for Compaction	-	ECY	95
[1B 13]	**Water Control / Dewatering**	**-**	**LS**	**1**
[1B 13 01]	**Cofferdam (Sheetpile PZ-27 40' Long)**	**-**	**SF**	**5,000**
	Steel Sheet Piles, Material	-	VLF	3,333
	Steel Sheet Piles, Driven	-	VLF	1,667
	Steel Sheet Piles, Removal	-	EA	333
[1B 13 02]	**Cofferdam Enclosure End Sections**	**-**	**SF**	**255**
	Steel Sheet Piles, Removal	-	EA	17
	Steel Sheet Piles, Driven	-	VLF	85
[1B 13 03]	**Wells**	**-**	**EA**	**10**
	Drill Well Holes	-	VLF	300
	Well Gravel Pack, Screen and Casing	-	VLF	300
	Dewatering Pump	-	DAY	213
	Dwatering Pump, Additional Pumps	-	DAY	852
	Generator	-	MO	7
[2A]	**REACH 2A**	**-**	**LS**	**1**
[2A 01]	**Mobilization**	**-**	**LS**	**1**
[2A 02]	**Excavation**	**-**	**CY**	**4,948**
	Excavation	3%	BCY	5,096
	Load Material	15%	CY	3,521
	Hauling	15%	LCY	3,521
	Tipping Fee	-	TON	6,680
[2A 03]	**Fill**	**-**	**CY**	**1,886**
	Fill	15%	BCY	2,169
	Compaction	-	CY	1,886
	Water Truck for Compaction	-	CY	1,886
[2A 04]	**Rock Base**	**-**	**CY**	**451**
	Gravel	15%	TON	778
[2A 05]	**Concrete**	**-**	**CY**	**1,090**
	Concrete, Forms	-	SFC	13,680
	Concrete, Material	10%	CY	1,199
	Concrete, Placing	10%	CY	1,199
[2A 06]	**Reinforcing Steel**	**-**	**TON**	**81.8**
	Reinforcing Steel, Material	-	TON	81.8
	Reinforcing Steel, Shop Handling	-	TON	81.8
[2A 07]	**Landscaping**	**-**	**SF**	**1,600**
	Seeding	-	SY	178
	Planting Trees	-	SF	1,600
[2A 08]	**Catch Basin**	**-**	**EA**	**2**
[2A 08 01]	**Excavation**	**-**	**CY**	**13**
	Structural Excavation	3%	BCY	13.7
	Load Material	15%	CY	15.3
	Hauling	15%	LCY	11.5
	Tipping Fee	-	TON	18.5
[2A 08 02]	**Footing**	**-**	**CY**	**10**
	Concrete, Forms	-	SFC	100
	Concrete, Material	10%	CY	11
	Concrete, Placing	10%	CY	11
[2A 08 03]	**Catch Basin**	**-**	**EA**	**2**
	Catch Basin	-	EA	2
[2A 08 04]	**Backfill**	**-**	**CY**	**3.3**
	Backfill	-	EA	3.3
[2A 09]	**24" RCP**	**-**	**LF**	**100**
	Excavation	-	CY	61
	Load Material	-	CY	61
	Hauling	15%	CY	13
	Tipping Fee	-	TON	18
	24" RCP	-	LF	100

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MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
	Backfill	-	CY	48
	Compaction	-	CY	48
[2A 10]	**Curb**	**-**	**LF**	**100**
[2A 10 01]	**Demo Curb and Gutter**	**-**	**LF**	**100**
	Demo Curb and Gutter	-	LF	100
	Load Material	-	CY	0.9
	Hauling	-	LCY	2
	Tipping Fee	-	TON	1.4
[2A 10 02]	**Replace Curb**	**-**	**LF**	**100**
	Curb and Gutter Placing	-	LF	100
[2A 11]	**AC Pavement**	**-**	**SF**	**250**
[2A 11 01]	**Remove AC Pavement**	**-**	**SY**	**28**
	Demo Pavement	-	SY	28
	Load Material	-	CY	9.3
	Hauling	-	LCY	9.3
	Tipping Fee	-	TON	6.9
[2A 11 02]	**Replace AC Pavement**	**-**	**SY**	**28**
	AC Pavement	10%	SY	30.6
[2B]	**REACH 2B**	**-**	**LS**	**1**
[2B 01]	**Mobilization**	**-**	**LS**	**1**
[2B 02]	**Storm Water Pollution Prevention Plan**	**-**	**LS**	**1**
	Storm Water Pollution Prevention Plan	-	LS	1
[2B 03]	**Water Pollution Control**	**-**	**LS**	**1**
	Water Pollution Control	-	LS	1
[2B 04]	**Construction Area Signs**	**-**	**LS**	**1**
	Signs	-	EA	15
[2B 05]	**Traffic Control**	**-**	**LS**	**1**
	Traffic Control	-	LS	1
[2B 06]	**Shoring of Excavation**	**-**	**SF**	**10,000**
	Shoring of Excavation	-	SF	10,000
[2B 07]	**Clearing and Grubbing**	**-**	**ACRE**	**1**
	Clearing and Grubbing	-	ACRE	1
	Hauling	-	CY	400
	Tipping Fee	-	TON	200
[2B 08]	**Additional Subgrade Excavation**	**-**	**CY**	**100**
	Structural Excavation	3%	CY	103
[2B 09]	**Structural Removals Per Plan**	**-**	**LS**	**1**
	Structural Removals Per Plan	-	LS	1
[2B 10]	**Unclassified Excavation**	**-**	**CY**	**14,800**
	Structural Excavation	3%	CY	15,244
	Hauling	15%	CY	17,020
[2B 11]	**Structural Concrete**	**-**	**CY**	**2,073**
	Concrete, Forms	-	SFC	20,000
	Concrete, Material	10%	CY	2,280
	Concrete, Placing	10%	CY	2,280
[2B 12]	**Structural Steel**	**-**	**LBS**	**357,954**
	Steel Material and Fabrication	-	LBS	357,954
[2B 13]	**12" PVC Storm Drain SDR 35**	**-**	**LF**	**77**
	12" PVC Pipe	-	LF	77
	Excavate and Load	-	CY	26
	Hauling	15%	LCY	30
	Tipping Fee	-	TON	35
[2B 14]	**15" PVC Storm Drain SDR 35**	**-**	**LF**	**102**
	15" PVC Pipe	-	LF	102
	Excavate and Load	-	CY	34
	Hauling	15%	LCY	39
	Tipping Fee	-	TON	46
[2B 15]	**18" RCP Storm Drain (D-load Per Plan)**	**-**	**LF**	**50**
	18" PVC Pipe	-	LF	50
	Excavate and Load	-	CY	17
	Hauling	15%	LCY	19
	Tipping Fee	-	TON	22.5
[2B 16]	**12" PVC Elbows SDR 35**	**-**	**EA**	**3**
	12" PVC Elbows	-	EA	3
[2B 17]	**15" PVC Elbows SDR 35**	**-**	**EA**	**2**
	15" PVC Elbows	-	EA	2
[2B 18]	**Install Pipe Hangers**	**-**	**EA**	**24**
	Pipe Hangers	-	EA	24
[2B 19]	**Remove and Replace Water Main**	**-**	**LS**	**1**
	Remove and Replace Water Main	-	LS	1
[2B 20]	**Manhole per SPPWC std. 321-1**	**-**	**EA**	**2**
	Excavate	-	CY	5
	Concrete Footing	10%	CY	2.3
	Manhole	-	EA	2
	Manhole Frame and Cover	-	EA	2
	Backfill	-	CY	1.3
	Hauling	15%	LCY	3.8
	Tipping Fee	-	TON	5.1
[2B 21]	**Manhole per SPPWC std. 323-1**	**-**	**EA**	**1**
	Excavate	-	CY	2.4
	Concrete Footing	10%	CY	1.2
	Manhole	-	EA	1
	Manhole Frame and Cover	-	EA	1
	Backfill	-	CY	0.6
	Hauling	15%	LCY	1.8
	Tipping Fee	-	TON	2.4

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MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
[2B 22]	**Monolithic Connection per SPPWC std. 308-1**	**-**	**EA**	**1**
	Monolithic Connection	-	EA	1
[2B 23]	**Concrete Collar**	**-**	**EA**	**3**
	Concrete, Forms	-	SFC	105
	Concrete, Material	10%	CY	4.95
	Concrete, Placing	10%	CY	4.95
[2B 24]	**Concrete Slurry**	**-**	**CY**	**2**
	Slurry	10%	CF	68.3
[2B 25]	**Flap Gate Inlet Per Detail**	**-**	**EA**	**2**
	Flap Gate	-	EA	2
[2B 26]	**Install Bulkhead**	**-**	**EA**	**1**
	Install Bulkhead	-	EA	1
[2B 27]	**Construct Debris Rack**	**-**	**EA**	**1**
	Construct Debris Rack	-	LS	1
[2B 28]	**Subdrain System**	**-**	**LF**	**548**
	Subdrain System	-	LF	548
[2B 29]	**Remove and Replace Curb and Gutter**	**-**	**LF**	**512**
	Demo Curb and Gutter	-	LF	512
	Load Material	-	CY	9.5
	Hauling	-	CY	9.5
	Tipping Fee	-	TON	7.1
	Place Curb and Gutter	-	LF	512
[2B 30]	**Remove and Replace PCC Pavement and Agg. Base**	**-**	**SF**	**17,408**
	Demo Pavement	-	SF	17,408
	Pavement Excavation	-	CY	322
	Load Material	-	CY	645
	Hauling	-	CY	645
	Tipping Fee	-	TON	484
	Aggregate Base Course	15%	SF	20,019
	Paving	10%	SF	19,149
[2B 31]	**Remove and Replace AC Pavement and Agg. Base**	**-**	**SF**	**4,550**
	Demo Pavement	-	SF	4,550
	Pavement Excavation	-	CY	84
	Load Material	-	CY	169
	Hauling	-	CY	169
	Tipping Fee	-	TON	126
	Aggregate Base Course	15%	SF	5,233
	Asphalt Paving	10%	SY	556
[2B 32]	**Striping**	**-**	**LS**	**1**
	Pavement Markings	-	LF	6,000
[2B 33]	**Install Chain Linke Fence**	**-**	**LF**	**363**
	Chain Link Fence	-	LF	363
[2B 34]	**Landscape Irrigation**	**-**	**LS**	**1**
	Landscape Irrigation	-	LS	1
[03]	**REACH 3**	**-**	**LS**	**1**
[03 00]	**Mobilization / Demobilization**	**-**	**LS**	**1**
[03 01]	**Demolition**	**-**	**LS**	**1**
[03 01 02]	**Demo Riprap**	**-**	**SY**	**370**
	Demo Concrete	-	SF	370
	Load Material	-	CY	185
	Hauling	-	LCY	370
	Tipping Fee	-	TON	278
[03 01 03]	**Demo Grouted Rock**	**-**	**SY**	**152**
	Demo Concrete	-	SF	152
	Load Material	-	CY	76
	Hauling	-	LCY	152
	Tipping Fee	-	TON	114
[03 01 04]	**Demo Concrete Slope**	**-**	**SF**	**2,836**
	Demo Concrete	-	SF	2,836
	Load Material	-	CY	53
	Hauling	-	LCY	105.0
	Tipping Fee	-	TON	78.8
[03 02]	**Channel Grading**	**-**	**LS**	**1**
[03 02 00]	**Clearing and Grubbing**	**-**	**ACRE**	**0.33**
	Clearing and Grubbing	-	ACRE	0.33
	Load Material	-	CY	132
	Hauling	-	LCY	132
	Tipping Fee	-	TON	66
[03 02 01]	**Excavate (Wall to Wall)**	**-**	**CY**	**6,080**
	Structural Excavation	3%	BCY	6,262
	Load Material	15%	CY	6,992
	Hauling	15%	LCY	6,992
	Tipping Fee	-	TON	8,208
[03 02 02]	**Excavate for Riprap Placement**	**-**	**CY**	**2,086**
	Structural Excavation	3%	BCY	2,149
	Load Material	15%	CY	2,399
	Hauling	15%	LCY	2,399
	Tipping Fee	-	TON	3,129
[03 02 03]	**Extra Excavation**	**-**	**CY**	**2,010**
	Structural Excavation	3%	BCY	2,070
	Load Material	15%	CY	2,312
	Hauling	15%	LCY	2,312
	Tipping Fee	-	TON	2,714
[03 02 04]	**Fill**	**-**	**CY**	**57**
	Structural Excavation	3%	BCY	58.7
	Compaction	-	ECY	57

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
	Water Truck for Compaction	-	ECY	57
[03 03]	**Channel Wall**	**-**	**LS**	**1**
[03 03 01]	**Wall Type A-1**	**-**	**LF**	**114**
[03 03 01 01]	**Soldier Piles**	**-**	**EA**	**24**
	Caisson Pile Drilling	-	VLF	1,272
	Soldier Piles, Material	-	VLF	1,272
	Concrete, Material	10%	CY	144
	Tipping Fee	10%	CY	144
[03 03 01 02]	**Timber Lagging**	**-**	**MBF**	**16.0**
	8" x 8" Timber Lagging	-	MBF	16.0
[03 03 01 03]	**Concrete**	**-**	**CY**	**211**
	Concrete, Forms	-	SFC	2,280
	Concrete, Material	10%	CY	232
	Concrete, Placing	10%	CY	232
[03 03 01 04]	**Reinforcing Steel**	**-**	**TON**	**15.8**
	Reinforcing Steel	-	TON	15.8
	Steel Shop Handling	-	TON	15.8
	Steel Unload and Sort	-	TON	15.8
[03 03 01 05]	**Drainage Mat**	**-**	**SF**	**2,280**
	Geotextile Drainage Mat	-	SF	2,280
[03 03 01 06]	**Weep Holes**	**-**	**EA**	**23**
	3" PVC Pipe	-	LF	46
	3" Steel Grate	-	EA	23
[03 03 01 07]	**Underdrain Pipe**	**-**	**LF**	**114**
	6" Perforated PVC Pipe	-	LF	114
	Base Course	15%	CY	11.2
	Geotextile Fabric	5%	SY	86
[03 03 02]	**Wall Type D-1**	**-**	**LF**	**165**
[03 03 02 01]	**Soldier Piles**	**-**	**EA**	**17**
	Caisson Pile Drilling	-	VLF	799
	Soldier Piles, Material	-	VLF	799
	Concrete, Material	10%	CY	102
	Tipping Fee	10%	CY	102
[03 03 02 02]	**Timber Lagging**	**-**	**MBF**	**16.2**
	8" x 8" Timber Lagging	-	MBF	16.2
[03 03 02 03]	**Concrete**	**-**	**CY**	**214**
	Concrete, Forms	-	SFC	2,310
	Concrete, Material	10%	CY	235
	Concrete, Placing	10%	CY	235
	Concrete Formliner	-	CY	2,310
[03 03 02 04]	**Reinforcing Steel**	**-**	**TON**	**16.0**
	Reinforcing Steel	-	TON	16.0
	Steel Shop Handling	-	TON	16.0
	Steel Unload and Sort	-	TON	16.0
[03 03 02 05]	**Drainage Mat**	**-**	**SF**	**2,310**
	Geotextile Drainage Mat	-	SF	2,310
[03 03 02 06]	**Weep Holes**	**-**	**EA**	**16**
	3" PVC Pipe	-	LF	32
	3" Steel Grate	-	EA	16
[03 03 02 07]	**Underdrain Pipe**	**-**	**LF**	**165**
	6" Perforated PVC Pipe	-	LF	165
	Base Course	15%	CY	16
	Geotextile Fabric	5%	SY	125
[03 04]	**Fill Material**	**-**	**LS**	**1**
[03 04 01]	**Riprap**	**-**	**TON**	**2,012**
[03 04 01 02]	**Channel Revetment Riprap**	**-**	**TON**	**1,561**
	Riprap	15%	TON	1,795
[03 04 01 03]	**Drop Structures Riprap**	**-**	**TON**	**451**
	Riprap	15%	TON	519
[03 04 02]	**Gravel**	**-**	**TON**	**596**
[03 04 02 01]	**Toe Revetment Gravel**	**-**	**TON**	**-**
	Gravel	15%	TON	-
[03 04 02 02]	**Channel Revetment Gravel**	**-**	**TON**	**520**
	Gravel	15%	TON	598
[03 04 02 03]	**Drop Revetment Gravel**	**-**	**TON**	**76**
	Gravel	15%	TON	87
[03 04 03]	**Filter Material**	**-**	**SY**	**2,381**
[03 04 03 01]	**Toe Revetment Geotextile**	**-**	**SY**	**-**
	Geotextile Fabric	5%	SY	-
[03 04 03 01]	**Channel Revetment Geotextile**	**-**	**SY**	**2,081**
	Geotextile Fabric	5%	SY	2,185
[03 04 03 01]	**Drop Revetment Geotextile**	**-**	**SY**	**299**
	Geotextile Fabric	5%	SY	314
[03 04 04]	**Native Soil**	**-**	**CY**	**347**
[03 04 04 01]	**Channel Revetment Native Soil**	**-**	**CY**	**347**
	Native Soil	15%	CY	399
[03 06]	**Access Ramps**	**-**	**CY**	**36**
	Concrete, Forms	-	SFC	360
	Concrete, Material	10%	CY	40
	Concrete, Placing	10%	CY	40
	Reinforcing Steel	-	TON	2.7
	Concrete, Broom Finish	-	SY	216
[03 07]	**Fencing**	**-**	**LS**	**1**
[03 07 01]	**Safety Fence**	**-**	**LF**	**405**
	Railing	-	LF	405

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MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
[03 08]	**Reinforced Gutter**	**-**	**LF**	**279**
	Concrete, Forms	-	SFC	116
	Concrete, Material	10%	CY	5.9
	Concrete, Placing	10%	CY	5.9
	Reinforcing Steel	-	TON	0.4
[03 09]	**Landscaping**	**-**	**LS**	**1**
	5 Gallon Trees	-	EA	1
	Tree Cuttings	-	EA	20
	Landscape Area	-	SF	7,665
	Landscape Maintenance	-	SF	7,665
	Irrigation	-	SF	7,665
[03 10]	**Diversion and Control of Water**	**-**	**LS**	**1**
	36" HDPE	-	LF	360
	Dewatering Line Maintenance	-	MO	6.5
[04]	**REACH 4**	**-**	**LS**	**1**
[04 00]	**Mobilization / Demobilization**	**-**	**LS**	**1**
[04 01]	**Demolition**	**-**	**LS**	**1**
[04 01 02]	**Demo Riprap**	**-**	**SY**	**14**
	Demo Concrete	-	SY	14
	Load Material	-	CY	7
	Hauling	-	LCY	14
	Tipping Fee	-	TON	10.5
[04 01 04]	**Demo Concrete Slope**	**-**	**SF**	**5,344**
	Demo Concrete	-	SF	5,344
	Load Material	-	CY	99
	Hauling	-	LCY	198
	Tipping Fee	-	TON	148
[04 02]	**Channel Grading**	**-**	**LS**	**1**
[04 02 00]	**Clearing and Grubbing**	**-**	**ACRE**	**0.42**
	Clearing and Grubbing	-	ACRE	0.42
	Load Material	-	CY	168
	Hauling	-	LCY	168
	Tipping Fee	-	TON	84
[04 02 01]	**Excavate (Wall to Wall)**	**-**	**CY**	**6,659**
	Structural Excavation	3%	BCY	6,859
	Load Material	15%	CY	7,658
	Hauling	15%	LCY	7,658
	Tipping Fee	-	TON	8,990
[04 02 02]	**Excavate for Riprap Placement**	**-**	**CY**	**2,016**
	Structural Excavation	3%	BCY	2,076
	Load Material	15%	CY	2,318
	Hauling	15%	LCY	2,318
	Tipping Fee	-	TON	3,024
[04 02 03]	**Extra Excavation**	**-**	**CY**	**2,448**
	Structural Excavation	3%	BCY	2,521
	Load Material	15%	CY	2,815
	Hauling	15%	LCY	2,815
	Tipping Fee	-	TON	3,305
[04 02 04]	**Fill**	**-**	**CY**	**14**
	Fill	15%	BCY	16.1
	Compaction	-	ECY	14.0
	Water Truck for Compaction	-	ECY	14.0
[04 03]	**Channel Wall**	**-**	**LS**	**1**
[04 03 01]	**Wall Type A-1**	**-**	**LF**	**40**
[04 03 01 01]	**Soldier Piles**	**-**	**EA**	**9**
	Caisson Pile Drilling	-	VLF	477
	Soldier Piles, Material	-	VLF	477
	Concrete, Material	10%	CY	54
	Tipping Fee	10%	CY	54
[04 03 01 02]	**Timber Lagging**	**-**	**MBF**	**5.6**
	8" x 8" Timber Lagging	-	MBF	5.6
[04 03 01 03]	**Concrete**	**-**	**CY**	**74**
	Concrete, Forms	-	SFC	800
	Concrete, Material	10%	CY	81
	Concrete, Placing	10%	CY	81
	Concrete, Formliner	-	SF	800
[04 03 01 04]	**Reinforcing Steel**	**-**	**TON**	**5.6**
	Reinforcing Steel	-	TON	5.6
	Steel Shop Handling	-	TON	5.6
	Steel Unload and Sort	-	TON	5.6
[04 03 01 05]	**Drainage Mat**	**-**	**SF**	**800**
	Geotextile Drainage Mat	-	SF	800
[04 03 01 06]	**Weep Holes**	**-**	**EA**	**8**
	3" PVC Pipe	-	LF	16
	3" Steel Grate	-	EA	8
[04 03 01 07]	**Underdrain Pipe**	**-**	**LF**	**40**
	6" Perforated PVC Pipe	-	LF	40
	Base Course	15%	CY	3.9
	Geotextile Fabric	5%	SY	30
[04 03 02]	**Wall Type B-1**	**-**	**LF**	**136**
[04 03 02 01]	**Soldier Piles**	**-**	**EA**	**24**
	Caisson Pile Drilling	-	VLF	1,224
	Soldier Piles, Material	-	VLF	1,224
	Concrete, Material	10%	CY	144
	Tipping Fee	10%	CY	144

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
[04 03 02 02]	**Timber Lagging**	**-**	**MBF**	**17.3**
	8" x 8" Timber Lagging	-	MBF	17.3
[04 03 02 03]	**Concrete**	**-**	**CY**	**227**
	Concrete, Forms	-	SFC	2,448
	Concrete, Material	10%	CY	249
	Concrete, Placing	10%	CY	249
	Concrete, Formliners	-	SF	1,760
[04 03 02 04]	**Reinforcing Steel**	**-**	**TON**	**17.0**
	Reinforcing Steel	-	TON	17.0
	Steel Shop Handling	-	TON	17.0
	Steel Unload and Sort	-	TON	17.0
[04 03 02 05]	**Drainage Mat**	**-**	**SF**	**2,448**
	Geotextile Drainage Mat	-	SF	2,448
[04 03 02 06]	**Weep Holes**	**-**	**EA**	**23**
	3" PVC Pipe	-	LF	46
	3" Steel Grate	-	EA	23
[04 03 02 07]	**Underdrain Pipe**	**-**	**LF**	**136**
	6" Perforated PVC Pipe	-	LF	136
	Base Course	15%	CY	13
	Geotextile Fabric	5%	SY	103
[04 03 03]	**Wall Type B-2**	**-**	**LF**	**104**
[04 03 03 01]	**Soldier Piles**	**-**	**EA**	**18**
	Caisson Pile Drilling	-	VLF	1,062
	Soldier Piles, Material	-	VLF	1,062
	Concrete, Material	10%	CY	137
	Tipping Fee	10%	CY	137
[04 03 03 02]	**Timber Lagging**	**-**	**MBF**	**13.2**
	8" x 8" Timber Lagging	-	MBF	13.2
[04 03 03 03]	**Concrete**	**-**	**CY**	**173**
	Concrete, Forms	-	SFC	1,872
	Concrete, Material	10%	CY	191
	Concrete, Placing	10%	CY	191
	Concrete, Formliners	-	SF	1,342
[04 03 03 04]	**Reinforcing Steel**	**-**	**TON**	**13.0**
	Reinforcing Steel	-	TON	13.0
	Steel Shop Handling	-	TON	13.0
	Steel Unload and Sort	-	TON	13.0
[04 03 03 05]	**Drainage Mat**	**-**	**SF**	**1,872**
	Geotextile Drainage Mat	-	SF	1,872
[04 03 03 06]	**Weep Holes**	**-**	**EA**	**17**
	3" PVC Pipe	-	LF	34
	3" Steel Grate	-	EA	17
[04 03 03 07]	**Underdrain Pipe**	**-**	**LF**	**104**
	6" Perforated PVC Pipe	-	LF	104
	Base Course	15%	CY	10
	Geotextile Fabric	5%	SY	79
[04 03 04]	**Wall Type C-1**	**-**	**LF**	**58**
[04 03 04 01]	**Soldier Piles**	**-**	**EA**	**8**
	Caisson Pile Drilling	-	VLF	392
	Soldier Piles, Material	-	VLF	392
	Concrete, Material	10%	CY	48
	Tipping Fee	10%	CY	48
[04 03 04 02]	**Timber Lagging**	**-**	**MBF**	**6.6**
	8" x 8" Timber Lagging	-	MBF	6.6
[04 03 04 03]	**Concrete**	**-**	**CY**	**86**
	Concrete, Forms	-	SFC	928
	Concrete, Material	10%	CY	95
	Concrete, Placing	10%	CY	95
	Concrete, Formliners	-	SF	667
[04 03 04 04]	**Reinforcing Steel**	**-**	**TON**	**6.4**
	Reinforcing Steel	-	TON	6.4
	Steel Shop Handling	-	TON	6.4
	Steel Unload and Sort	-	TON	6.4
[04 03 04 05]	**Drainage Mat**	**-**	**SF**	**928**
	Geotextile Drainage Mat	-	SF	928
[04 03 04 06]	**Weep Holes**	**-**	**EA**	**7**
	3" PVC Pipe	-	LF	14
	3" Steel Grate	-	EA	7
[04 03 04 07]	**Underdrain Pipe**	**-**	**LF**	**58**
	6" Perforated PVC Pipe	-	LF	58
	Base Course	15%	CY	5.7
	Geotextile Fabric	5%	SY	44
[04 03 05]	**Wall Type D-1**	**-**	**LF**	**592**
[04 03 05 01]	**Soldier Piles**	**-**	**EA**	**60**
	Caisson Pile Drilling	-	VLF	2,820
	Soldier Piles, Material	-	VLF	2,820
	Concrete, Material	10%	CY	360
	Tipping Fee	10%	CY	360
[04 03 05 02]	**Timber Lagging**	**-**	**MBF**	**58.0**
	8" x 8" Timber Lagging	-	MBF	58.0
[04 03 05 03]	**Concrete**	**-**	**CY**	**767**
	Concrete, Forms	-	SFC	8,288
	Concrete, Material	10%	CY	844
	Concrete, Placing	10%	CY	844
	Concrete, Formliners	-	SF	5,948

Lower Mission Creek
Work Breakdown Structure

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
[04 03 05 04]	**Reinforcing Steel**	**-**	**TON**	**57.5**
	Reinforcing Steel	-	TON	57.5
	Steel Shop Handling	-	TON	57.5
	Steel Unload and Sort	-	TON	57.5
[04 03 05 05]	**Drainage Mat**	**-**	**SF**	**8,288**
	Geotextile Drainage Mat	-	SF	8,288
[04 03 05 06]	**Weep Holes**	**-**	**EA**	**59**
	3" PVC Pipe	-	LF	118
	3" Steel Grate	-	EA	59
[04 03 05 07]	**Underdrain Pipe**	**-**	**LF**	**592**
	6" Perforated PVC Pipe	-	LF	592
	Base Course	15%	CY	58
	Geotextile Fabric	5%	SY	449
[04 04]	**Fill Material**	**-**	**LS**	**1**
[04 04 01]	**Riprap**	**-**	**TON**	**1,950**
[04 04 01 02]	**Channel Revetment Riprap**	**-**	**TON**	**1,499**
	Riprap	15%	TON	1,723
[04 04 01 03]	**Drop Structures Riprap**	**-**	**TON**	**451**
	Riprap	15%	TON	519
[04 04 02]	**Gravel**	**-**	**TON**	**575**
[04 04 02 02]	**Channel Revetment Gravel**	**-**	**TON**	**500**
	Gravel	15%	TON	574
[04 04 02 03]	**Drop Revetment Gravel**	**-**	**TON**	**76**
	Gravel	15%	TON	87
[04 04 03]	**Filter Material**	**-**	**SY**	**255**
[04 04 03 01]	**Channel Revetment Geotextile**	**-**	**SY**	**1,998**
	Geotextile Fabric	5%	SY	2,098
[04 04 03 01]	**Drop Revetment Geotextile**	**-**	**SY**	**299**
	Geotextile Fabric	5%	SY	314
[04 04 04]	**Native Soil**	**-**	**CY**	**333**
[04 04 04 01]	**Channel Revetment Native Soil**	**-**	**CY**	**333**
	Native Soil	15%	CY	383
[04 05]	**Boulder Cluster**	**-**	**EA**	**1**
	Boulder Cluster	-	LF	100
[04 07]	**Fencing**	**-**	**LS**	**1**
[04 07 01]	**Safety Fence**	**-**	**LF**	**986**
	Railing	-	LF	986
[04 08]	**PCC Gutter**	**-**	**LF**	**930**
	Concrete, Forms	-	SFC	388
	Concrete, Material	10%	CY	19.7
	Concrete, Placing	10%	CY	19.7
[04 08]	**Reinforced Gutter**	**-**	**LF**	**930**
	Concrete, Forms	-	SFC	388
	Concrete, Material	10%	CY	19.7
	Concrete, Placing	10%	CY	19.7
	Reinforcing Steel	-	TON	1.48
[04 09]	**Landscaping**	**-**	**LS**	**1**
	5 Gallon Trees	-	EA	5
	Tree Cuttings	-	EA	8
	Landscape Area	-	SF	12,479
	Landscape Maintenance	-	SF	12,479
	Irrigation	-	SF	12,479
[04 10]	**Diversion and Control of Water**	**-**	**LS**	**1**
	36" HDPE	-	LF	530
	Dewatering Line Maintenance	-	MO	7
[05]	**REACH 5**	**-**	**LS**	**1**
[05 00]	**Mobilization / Demobilization**	**-**	**LS**	**1**
[05 01]	**Demolition**	**-**	**LS**	**1**
[05 01 02]	**Demo Grouted Rock**	**-**	**SY**	**191**
	Demo Grouted Rock	-	SF	191
	Load Material	-	CY	96
	Hauling	-	LCY	191
	Tipping Fee	-	TON	144
[05 01 04]	**Demo Concrete Slope**	**-**	**SF**	**1,905**
	Demo Concrete	-	SF	1,905
	Load Material	-	CY	35
	Hauling	-	LCY	70.6
	Tipping Fee	-	TON	52.9
[05 01 05]	**Demo Concrete Bags**	**-**	**SF**	**1,690**
	Demo Concrete	-	SF	1,690
	Load Material	-	CY	94
	Hauling	-	LCY	187.8
	Tipping Fee	-	TON	140.8
[05 02]	**Channel Grading**	**-**	**LS**	**1**
[05 02 00]	**Clearing and Grubbing**	**-**	**ACRE**	**0.39**
	Clearing and Grubbing	-	ACRE	0.39
	Load Material	-	CY	156
	Hauling	-	LCY	156
	Tipping Fee	-	TON	78
[05 02 01]	**Excavate (Wall to Wall)**	**-**	**CY**	**6,319**
	Structural Excavation	3%	BCY	6,509
	Load Material	15%	CY	7,267
	Hauling	15%	LCY	7,267
	Tipping Fee	-	TON	8,531
[05 02 02]	**Excavate for Riprap Placement**	**-**	**CY**	**2,901**
	Structural Excavation	3%	BCY	2,988

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
	Load Material	15%	CY	3,336
	Hauling	15%	LCY	3,336
	Tipping Fee	-	TON	3,916
[05 02 03]	**Extra Excavation**	**-**	**CY**	**2,764**
	Structural Excavation	3%	BCY	2,847
	Load Material	15%	CY	3,179
	Hauling	15%	LCY	3,179
	Tipping Fee	-	TON	3,731
[05 02 04]	**Fill**	**-**	**CY**	**21**
	Fill	15%	BCY	24.2
	Compaction	-	ECY	21.0
	Water Truck for Compaction	-	ECY	21.0
[05 03]	**Channel Wall**	**-**	**LS**	**1**
[05 03 01]	**Wall Type B-2**	**-**	**LF**	**668**
[05 03 01 01]	**Soldier Piles**	**-**	**EA**	**112**
	Caisson Pile Drilling	-	VLF	6,608
	Soldier Piles, Material	-	VLF	6,608
	Concrete, Material	10%	CY	851
	Tipping Fee	10%	CY	851
[05 03 01 02]	**Timber Lagging**	**-**	**MBF**	**84.5**
	8" x 8" Timber Lagging	-	MBF	84.5
[05 03 01 03]	**Concrete**	**-**	**CY**	**1,113**
	Concrete, Forms	-	SFC	12,024
	Concrete, Material	10%	CY	1,224
	Concrete, Placing	10%	CY	1,224
	Formliner	-	SF	9,099
[05 03 01 04]	**Reinforcing Steel**	**-**	**TON**	**83.5**
	Reinforcing Steel	-	TON	83.5
	Steel Shop Handling	-	TON	83.5
	Steel Unload and Sort	-	TON	83.5
[05 03 01 05]	**Drainage Mat**	**-**	**SF**	**12,024**
	Geotextile Drainage Mat	-	SF	12,024
[05 03 01 06]	**Weep Holes**	**-**	**EA**	**111**
	3" PVC Pipe	-	LF	222
	3" Steel Grate	-	EA	111
[05 03 01 07]	**Underdrain Pipe**	**-**	**LF**	**668**
	6" Perforated PVC Pipe	-	LF	668
	Base Course	15%	CY	65
	Geotextile Fabric	5%	SY	507
[05 03 02]	**Wall Type C-2**	**-**	**LF**	**76**
[05 03 02 01]	**Soldier Piles**	**-**	**EA**	**11**
	Caisson Pile Drilling	-	VLF	627
	Soldier Piles, Material	-	VLF	627
	Concrete, Material	10%	CY	84
	Tipping Fee	10%	CY	84
[05 03 02 02]	**Timber Lagging**	**-**	**MBF**	**8.6**
	8" x 8" Timber Lagging	-	MBF	8.6
[05 03 02 03]	**Concrete**	**-**	**CY**	**113**
	Concrete, Forms	-	SFC	1,216
	Concrete, Material	10%	CY	124
	Concrete, Placing	10%	CY	124
	Formliner	-	SF	924
[05 03 02 04]	**Reinforcing Steel**	**-**	**TON**	**8.4**
	Reinforcing Steel	-	TON	8.4
	Steel Shop Handling	-	TON	8.4
	Steel Unload and Sort	-	TON	8.4
[05 03 02 05]	**Drainage Mat**	**-**	**SF**	**1,216**
	Geotextile Drainage Mat	-	SF	1,216
[05 03 02 06]	**Weep Holes**	**-**	**EA**	**10**
	3" PVC Pipe	-	LF	20
	3" Steel Grate	-	EA	10
[05 03 02 07]	**Underdrain Pipe**	**-**	**LF**	**76**
	6" Perforated PVC Pipe	-	LF	76
	Base Course	15%	CY	7.4
	Geotextile Fabric	5%	SY	58
[05 03 03]	**Wall Type D-1**	**-**	**LF**	**348**
[05 03 03 01]	**Soldier Piles**	**-**	**EA**	**36**
	Caisson Pile Drilling	-	VLF	1,980
	Soldier Piles, Material	-	VLF	1,980
	Concrete, Material	10%	CY	274
	Tipping Fee	10%	CY	274
[05 03 03 02]	**Timber Lagging**	**-**	**MBF**	**34.3**
	8" x 8" Timber Lagging	-	MBF	34.3
[05 03 03 03]	**Concrete**	**-**	**CY**	**451**
	Concrete, Forms	-	SFC	4,872
	Concrete, Material	10%	CY	496
	Concrete, Placing	10%	CY	496
	Formliner	-	SF	3,687
[05 03 03 04]	**Reinforcing Steel**	**-**	**TON**	**33.8**
	Reinforcing Steel	-	TON	33.8
	Steel Shop Handling	-	TON	33.8
	Steel Unload and Sort	-	TON	33.8
[05 03 03 05]	**Drainage Mat**	**-**	**SF**	**4,872**
	Geotextile Drainage Mat	-	SF	4,872
[05 03 03 06]	**Weep Holes**	**-**	**EA**	**35**
	3" PVC Pipe	-	LF	70

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
	3" Steel Grate	-	EA	35
[05 03 03 07]	**Underdrain Pipe**	**-**	**LF**	**348**
	6" Perforated PVC Pipe	-	LF	348
	Base Course	15%	CY	34
	Geotextile Fabric	5%	SY	264
[05 04]	**Fill Material**	**-**	**LS**	**1**
[05 04 01]	**Riprap**	**-**	**CY**	**2,746**
[05 04 01 02]	**Channel Revetment Riprap**	**-**	**CY**	**2,295**
	Riprap	15%	LCY	2,639
[05 04 01 03]	**Drop Structures Riprap**	**-**	**CY**	**451**
	Riprap	15%	LCY	519
[05 04 02]	**Gravel**	**-**	**CY**	**841**
[05 04 02 02]	**Channel Revetment Gravel**	**-**	**CY**	**765**
	Gravel	15%	LCY	880
[05 04 02 03]	**Drop Revetment Gravel**	**-**	**CY**	**76**
	Gravel	15%	LCY	87
[05 04 03]	**Filter Material**	**-**	**SY**	**3,359**
[05 04 03 01]	**Channel Revetment Geotextile**	**-**	**SY**	**3,059**
	Geotextile Fabric	5%	SY	3,212
[05 04 03 01]	**Drop Revetment Geotextile**	**-**	**SY**	**299**
	Geotextile Fabric	5%	SY	314
[05 04 04]	**Native Soil**	**-**	**CY**	**510**
[05 04 04 01]	**Channel Revetment Native Soil**	**-**	**CY**	**510**
	Native Soil	15%	CY	587
	Compaction	-	ECY	510
	Grading	-	BCY	510
	Water Truck for Compaction	-	ECY	510
[05 05]	**Boulder Cluster**	**-**	**EA**	**2**
	Boulder Cluster	-	TON	66
[05 07]	**Fencing**	**-**	**LS**	**1**
[05 07 01]	**Safety Fence**	**-**	**LF**	**1,080**
	Railing	-	LF	1,080
[05 08]	**PCC Gutter**	**-**	**LF**	**1,092**
	Concrete, Forms	-	SFC	455
	Concrete, Material	10%	CY	23.2
	Concrete, Placing	10%	CY	23.2
[05 08]	**Reinforced Gutter**	**-**	**LF**	**1,092**
	Concrete, Forms	-	SFC	455
	Concrete, Material	10%	CY	23.2
	Concrete, Placing	10%	CY	23.2
	Reinforcing Steel	-	TON	1.74
[05 09]	**Landscaping**	**-**	**LS**	**1**
	5 Gallon Trees	-	EA	3
	Tree Cuttings	-	EA	24
	Landscape Area	-	SF	10,102
	Landscape Maintenance	-	SF	10,102
	Irrigation	-	SF	10,102
[05 10]	**Diversion and Control of Water**	**-**	**LS**	**1**
	36" HDPE	-	LF	545
	Dewatering Line Maintenance	-	MO	8
[06]	**REACH 6**	**-**	**LS**	**1**
[06 00]	**Mobilization / Demobilization**	**-**	**LS**	**1**
[06 01]	**Demolition**	**-**	**LS**	**1**
[06 01 01]	**Demo Gabions**	**-**	**SY**	**149**
	Demo Grouted Rock	-	SF	149
	Load Material	-	CY	75
	Hauling	-	LCY	149
	Tipping Fee	-	TON	112
[06 01 02]	**Demo Riprap**	**-**	**SY**	**64**
	Demo Riprap	-	SF	64
	Load Material	-	CY	32
	Hauling	-	LCY	64
	Tipping Fee	-	TON	96
[06 01 03]	**Demo Grouted Rock**	**-**	**SY**	**333**
	Demo Grouted Rock	-	SY	333
	Load Material	-	CY	167
	Hauling	-	LCY	333
	Tipping Fee	-	TON	250
[06 01 05]	**Demo Concrete Bags**	**-**	**SF**	**172**
	Demo Concrete	-	SF	172
	Load Material	-	CY	86
	Hauling	-	LCY	172.0
	Tipping Fee	-	TON	129.0
[06 02]	**Channel Grading**	**-**	**LS**	**1**
[06 02 00]	**Clearing and Grubbing**	**-**	**ACRE**	**0.38**
	Clearing and Grubbing	-	ACRE	0.38
	Load Material	-	CY	152
	Hauling	-	LCY	152
	Tipping Fee	-	TON	76
[06 02 01]	**Excavate (Wall to Wall)**	**-**	**CY**	**3,730**
	Structural Excavation	3%	BCY	3,842
	Load Material	15%	CY	4,290
	Hauling	15%	LCY	4,290
	Tipping Fee	-	TON	5,036
[06 02 02]	**Excavate for Riprap Placement**	**-**	**CY**	**4,849**
	Structural Excavation	3%	BCY	4,994

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
	Load Material	15%	CY	5,576
	Hauling	15%	LCY	5,576
	Tipping Fee	-	TON	6,546
[06 02 03]	**Extra Excavation**	**-**	**CY**	**1,754**
	Structural Excavation	3%	BCY	1,807
	Load Material	15%	CY	2,017
	Hauling	15%	LCY	2,017
	Tipping Fee	-	TON	2,368
[06 02 04]	**Fill**	**-**	**CY**	**93**
	Fill	15%	BCY	107.0
	Compaction	-	ECY	93.0
	Water Truck for Compaction	-	ECY	93.0
[06 03]	**Channel Wall**	**-**	**LS**	**1**
[06 03 01]	**Wall Type A-2**	**-**	**LF**	**124**
[06 03 01 01]	**Soldier Piles**	**-**	**EA**	**26**
	Caisson Pile Drilling	-	VLF	1,586
	Soldier Piles, Material	-	VLF	1,586
	Concrete, Material	10%	CY	198
	Tipping Fee	10%	CY	198
[06 03 01 02]	**Timber Lagging**	**-**	**MBF**	**17.4**
	8" x 8" Timber Lagging	-	MBF	17.4
[06 03 01 03]	**Concrete**	**-**	**CY**	**230**
	Concrete, Forms	-	SFC	2,480
	Concrete, Material	10%	CY	253
	Concrete, Placing	10%	CY	253
	Formliner	-	SF	1,962
[06 03 01 04]	**Reinforcing Steel**	**-**	**TON**	**17.2**
	Reinforcing Steel	-	TON	17.2
	Steel Shop Handling	-	TON	17.2
	Steel Unload and Sort	-	TON	17.2
[06 03 01 05]	**Drainage Mat**	**-**	**SF**	**2,480**
	Geotextile Drainage Mat	-	SF	2,480
[06 03 01 06]	**Weep Holes**	**-**	**EA**	**25**
	3" PVC Pipe	-	LF	50
	3" Steel Grate	-	EA	25
[06 03 01 07]	**Underdrain Pipe**	**-**	**LF**	**124**
	6" Perforated PVC Pipe	-	LF	124
	Base Course	15%	CY	12
	Geotextile Fabric	5%	SY	94
[05 03 02]	**Wall Type B-2**	**-**	**LF**	**276**
[05 03 02 01]	**Soldier Piles**	**-**	**EA**	**47**
	Caisson Pile Drilling	-	VLF	2,773
	Soldier Piles, Material	-	VLF	2,773
	Concrete, Material	10%	CY	357
	Tipping Fee	10%	CY	357
[05 03 02 02]	**Timber Lagging**	**-**	**MBF**	**34.9**
	8" x 8" Timber Lagging	-	MBF	34.9
[05 03 02 03]	**Concrete**	**-**	**CY**	**460**
	Concrete, Forms	-	SFC	4,968
	Concrete, Material	10%	CY	506
	Concrete, Placing	10%	CY	506
	Formliner	-	SF	3,925
[05 03 02 04]	**Reinforcing Steel**	**-**	**TON**	**34.5**
	Reinforcing Steel	-	TON	34.5
	Steel Shop Handling	-	TON	34.5
	Steel Unload and Sort	-	TON	34.5
[05 03 02 05]	**Drainage Mat**	**-**	**SF**	**4,968**
	Geotextile Drainage Mat	-	SF	4,968
[05 03 02 06]	**Weep Holes**	**-**	**EA**	**46**
	3" PVC Pipe	-	LF	92
	3" Steel Grate	-	EA	46
[05 03 02 07]	**Underdrain Pipe**	**-**	**LF**	**276**
	6" Perforated PVC Pipe	-	LF	276
	Base Course	15%	CY	27
	Geotextile Fabric	5%	SY	209
[06 03 03]	**Wall Type C-2**	**-**	**LF**	**80**
[06 03 03 01]	**Soldier Piles**	**-**	**EA**	**11**
	Caisson Pile Drilling	-	VLF	627
	Soldier Piles, Material	-	VLF	627
	Concrete, Material	10%	CY	84
	Tipping Fee	10%	CY	84
[06 03 03 02]	**Timber Lagging**	**-**	**MBF**	**9.0**
	8" x 8" Timber Lagging	-	MBF	9.0
[06 03 03 03]	**Concrete**	**-**	**CY**	**119**
	Concrete, Forms	-	SFC	1,280
	Concrete, Material	10%	CY	130
	Concrete, Placing	10%	CY	130
	Formliner	-	SF	1,015
[06 03 03 04]	**Reinforcing Steel**	**-**	**TON**	**8.9**
	Reinforcing Steel	-	TON	8.9
	Steel Shop Handling	-	TON	8.9
	Steel Unload and Sort	-	TON	8.9
[06 03 03 05]	**Drainage Mat**	**-**	**SF**	**1,280**
	Geotextile Drainage Mat	-	SF	1,280
[06 03 03 06]	**Weep Holes**	**-**	**EA**	**10**
	3" PVC Pipe	-	LF	20

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
	3" Steel Grate	-	EA	10
[06 03 03 07]	**Underdrain Pipe**	**-**	**LF**	**80**
	6" Perforated PVC Pipe	-	LF	80
	Base Course	15%	CY	8
	Geotextile Fabric	5%	SY	61
[06 03 04]	**Wall Type D-2**	**-**	**LF**	**184**
[06 03 04 01]	**Soldier Piles**	**-**	**EA**	**19**
	Caisson Pile Drilling	-	VLF	1,045
	Soldier Piles, Material	-	VLF	1,045
	Concrete, Material	10%	CY	144
	Tipping Fee	10%	CY	144
[06 03 04 02]	**Timber Lagging**	**-**	**MBF**	**18**
	8" x 8" Timber Lagging	-	MBF	18
[06 03 04 03]	**Concrete**	**-**	**CY**	**239**
	Concrete, Forms	-	SFC	2,576
	Concrete, Material	10%	CY	262
	Concrete, Placing	10%	CY	262
	Formliner	-	SF	2,039
[06 03 04 04]	**Reinforcing Steel**	**-**	**TON**	**17.9**
	Reinforcing Steel	-	TON	17.9
	Steel Shop Handling	-	TON	17.9
	Steel Unload and Sort	-	TON	17.9
[06 03 04 05]	**Drainage Mat**	**-**	**SF**	**2,576**
	Geotextile Drainage Mat	-	SF	2,576
[06 03 04 06]	**Weep Holes**	**-**	**EA**	**18**
	3" PVC Pipe	-	LF	36
	3" Steel Grate	-	EA	18
[06 03 04 07]	**Underdrain Pipe**	**-**	**LF**	**184**
	6" Perforated PVC Pipe	-	LF	184
	Base Course	15%	CY	18
	Geotextile Fabric	5%	SY	140
[06 04]	**Fill Material**	**-**	**LS**	**1**
[06 04 01]	**Riprap**	**-**	**CY**	**4,499**
[06 04 01 02]	**Channel Revetment Riprap**	**-**	**CY**	**4,048**
	Riprap	15%	LCY	4,655
[06 04 01 03]	**Drop Structures Riprap**	**-**	**CY**	**451**
	Riprap	15%	LCY	519
[06 04 02]	**Gravel**	**-**	**CY**	**1,425**
[06 04 02 02]	**Channel Revetment Gravel**	**-**	**CY**	**1,349**
	Gravel	15%	LCY	1,551
[06 04 02 03]	**Drop Revetment Gravel**	**-**	**CY**	**76**
	Gravel	15%	LCY	87
[06 04 03]	**Filter Material**	**-**	**SY**	**5,696**
[06 04 03 01]	**Channel Revetment Geotextile**	**-**	**SY**	**5,397**
	Geotextile Fabric	5%	SY	5,667
[06 04 03 01]	**Drop Revetment Geotextile**	**-**	**SY**	**299**
	Geotextile Fabric	5%	SY	314
[06 04 04]	**Native Soil**	**-**	**CY**	**899**
[06 04 04 01]	**Channel Revetment Native Soil**	**-**	**CY**	**899**
	Native Soil	15%	CY	1,034
	Compaction	-	ECY	899
	Grading	-	BCY	899
	Water Truck for Compaction	-	ECY	899
[06 04 04 02]	**Channel Revetment Native Soil**	**-**	**CY**	**899**
	Fill from Stockpile	15%	CY	1,034
	Compaction	-	CY	899
	Grading	-	CY	899
[06 05]	**Boulder Cluster**	**-**	**EA**	**1**
	Boulder Cluster	-	TON	33
[06 06]	**Access Ramps**	**-**	**CY**	**29**
	Concrete, Forms	-	SFC	290
	Concrete, Material	10%	CY	32
	Concrete, Placing	10%	CY	32
	Reinforcing Steel	-	TON	2.2
	Concrete Broom Finish	-	SY	174.0
[06 07]	**Fencing**	**-**	**LS**	**1**
[06 07 01]	**Safety Fence**	**-**	**LF**	**653**
	Railing	-	LF	653
[06 07 02]	**Access Fence**	**-**	**LF**	**226**
	Chain Link Fence	-	LF	226
[06 07 03]	**Access Gate**	**-**	**EA**	**1**
	Access Gate	-	EA	1
[06 08]	**PCC Gutter**	**-**	**LF**	**664**
	Concrete, Forms	-	SFC	277
	Concrete, Material	10%	CY	14.1
	Concrete, Placing	10%	CY	14.1
[06 08]	**Reinforced Gutter**	**-**	**LF**	**664**
	Concrete, Forms	-	SFC	277
	Concrete, Material	10%	CY	14.1
	Concrete, Placing	10%	CY	14.1
	Reinforcing Steel	-	TON	1.06
[06 09]	**Landscaping**	**-**	**LS**	**1**
	24" Box Trees	-	EA	1
	5 Gallon Trees	-	EA	6
	Tree Cuttings	-	EA	4
	Landscape Area	-	SF	12,073

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
	Landscape Maintenance	-	SF	12,073
	Irrigation	-	SF	12,073
[06 10]	**Diversion and Control of Water**	**-**	**LS**	**1**
	36" HDPE	-	LF	535
	Dewatering Line Maintenance	-	MO	7
[07]	**REACH 7**	**-**	**LS**	**1**
[07 00]	**Mobilization / Demobilization**	**-**	**LS**	**1**
[07 01]	**Demolition**	**-**	**LS**	**1**
[07 01 02]	**Demo Riprap**	**-**	**SY**	**226**
	Demo Riprap	-	SY	226
	Load Material	-	CY	113
	Hauling	-	LCY	226
	Tipping Fee	-	TON	170
[07 01 05]	**Demo Concrete Bags**	**-**	**SF**	**3,166**
	Demo Concrete	-	SF	3,166
	Load Material	-	CY	176
	Hauling	-	LCY	352
	Tipping Fee	-	TON	264
[07 02]	**Channel Grading**	**-**	**LS**	**1**
[07 02 00]	**Clearing and Grubbing**	**-**	**ACRE**	**0.60**
	Clearing and Grubbing	-	ACRE	0.60
	Load Material	-	CY	240
	Hauling	-	LCY	240
	Tipping Fee	-	TON	120
[07 02 01]	**Excavate (Wall to Wall)**	**-**	**CY**	**6,033**
	Structural Excavation	3%	BCY	6,214
	Load Material	15%	CY	6,938
	Hauling	15%	LCY	6,938
	Tipping Fee	-	TON	8,145
[07 02 02]	**Excavate for Riprap Placement**	**-**	**CY**	**4,970**
	Structural Excavation	3%	BCY	5,119
	Load Material	15%	CY	5,716
	Hauling	15%	LCY	5,716
	Tipping Fee	-	TON	6,710
[07 02 03]	**Extra Excavation**	**-**	**CY**	**3,918**
	Structural Excavation	3%	BCY	4,036
	Load Material	15%	CY	4,506
	Hauling	15%	LCY	4,506
	Tipping Fee	-	TON	5,289
[07 02 04]	**Fill**	**-**	**CY**	**303**
	Structural Excavation	3%	BCY	312
	Compaction	-	ECY	303
	Water Truck for Compaction	-	ECY	303
[07 03]	**Channel Wall**	**-**	**LS**	**1**
[07 03 01]	**Wall Type A-2**	**-**	**LF**	**32**
[07 03 01 01]	**Soldier Piles**	**-**	**EA**	**7**
	Caisson Pile Drilling	-	VLF	427
	Soldier Piles, Material	-	VLF	427
	Concrete, Material	10%	CY	53
	Tipping Fee	10%	CY	53
[07 03 01 02]	**Timber Lagging**	**-**	**MBF**	**4.5**
	8" x 8" Timber Lagging	-	MBF	4.5
[07 03 01 03]	**Concrete**	**-**	**CY**	**59**
	Concrete, Forms	-	SFC	640
	Concrete, Material	10%	CY	65
	Concrete, Placing	10%	CY	65
	Formliner	-	SF	473
[07 03 01 04]	**Reinforcing Steel**	**-**	**TON**	**4.4**
	Reinforcing Steel	-	TON	4.4
	Steel Shop Handling	-	TON	4.4
	Steel Unload and Sort	-	TON	4.4
[07 03 01 05]	**Drainage Mat**	**-**	**SF**	**640**
	Geotextile Drainage Mat	-	SF	640
[07 03 01 06]	**Weep Holes**	**-**	**EA**	**6**
	3" PVC Pipe	-	LF	12
	3" Steel Grate	-	EA	6
[07 03 01 07]	**Underdrain Pipe**	**-**	**LF**	**32**
	6" Perforated PVC Pipe	-	LF	32
	Base Course	15%	CY	3.1
	Geotextile Fabric	5%	SY	24
[07 03 02]	**Wall Type B-2**	**-**	**LF**	**222**
[07 03 02 01]	**Soldier Piles**	**-**	**EA**	**38**
	Caisson Pile Drilling	-	VLF	2,242
	Soldier Piles, Material	-	VLF	2,242
	Concrete, Material	10%	CY	289
	Tipping Fee	10%	CY	289
[07 03 02 02]	**Timber Lagging**	**-**	**MBF**	**28.1**
	8" x 8" Timber Lagging	-	MBF	28.1
[07 03 02 03]	**Concrete**	**-**	**CY**	**370**
	Concrete, Forms	-	SFC	3,996
	Concrete, Material	10%	CY	407
	Concrete, Placing	10%	CY	407
	Formliner	-	SF	2,965
[07 03 02 04]	**Reinforcing Steel**	**-**	**TON**	**27.8**
	Reinforcing Steel	-	TON	27.8
	Steel Shop Handling	-	TON	27.8

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
	Steel Unload and Sort	-	TON	27.8
[07 03 02 05]	**Drainage Mat**	**-**	**SF**	**3,996**
	Geotextile Drainage Mat	-	SF	3,996
[07 03 02 06]	**Weep Holes**	**-**	**EA**	**37**
	3" PVC Pipe	-	LF	74
	3" Steel Grate	-	EA	37
[07 03 02 07]	**Underdrain Pipe**	**-**	**LF**	**222**
	6" Perforated PVC Pipe	-	LF	222
	Base Course	15%	CY	22
	Geotextile Fabric	5%	SY	168
[07 03 03]	**Wall Type C-2**	**-**	**LF**	**416**
[07 03 03 01]	**Soldier Piles**	**-**	**EA**	**53**
	Caisson Pile Drilling	-	VLF	3,021
	Soldier Piles, Material	-	VLF	3,021
	Concrete, Material	10%	CY	403
	Tipping Fee	10%	CY	403
[07 03 03 02]	**Timber Lagging**	**-**	**MBF**	**47**
	8" x 8" Timber Lagging	-	MBF	47
[07 03 03 03]	**Concrete**	**-**	**CY**	**616**
	Concrete, Forms	-	SFC	6,656
	Concrete, Material	10%	CY	678
	Concrete, Placing	10%	CY	678
	Formliner	-	SF	4,936
[07 03 03 04]	**Reinforcing Steel**	**-**	**TON**	**46.2**
	Reinforcing Steel	-	TON	46.2
	Steel Shop Handling	-	TON	46.2
	Steel Unload and Sort	-	TON	46.2
[07 03 03 05]	**Drainage Mat**	**-**	**SF**	**6,656**
	Geotextile Drainage Mat	-	SF	6,656
[07 03 03 06]	**Weep Holes**	**-**	**EA**	**52**
	3" PVC Pipe	-	LF	104
	3" Steel Grate	-	EA	52
[07 03 03 07]	**Underdrain Pipe**	**-**	**LF**	**416**
	6" Perforated PVC Pipe	-	LF	416
	Base Course	15%	CY	41
	Geotextile Fabric	5%	SY	315
[07 03 04]	**Wall Type D-2**	**-**	**LF**	**660**
[07 03 04 01]	**Soldier Piles**	**-**	**EA**	**67**
	Caisson Pile Drilling	-	VLF	3,685
	Soldier Piles, Material	-	VLF	3,685
	Concrete, Material	10%	CY	509
	Tipping Fee	10%	CY	509
[07 03 04 02]	**Timber Lagging**	**-**	**MBF**	**65.0**
	8" x 8" Timber Lagging	-	MBF	65.0
[07 03 04 03]	**Concrete**	**-**	**CY**	**856**
	Concrete, Forms	-	SFC	9,240
	Concrete, Material	10%	CY	941
	Concrete, Placing	10%	CY	941
	Formliner	-	SF	6,860
[07 03 04 04]	**Reinforcing Steel**	**-**	**TON**	**64.2**
	Reinforcing Steel	-	TON	64.2
	Steel Shop Handling	-	TON	64.2
	Steel Unload and Sort	-	TON	64.2
[07 03 04 05]	**Drainage Mat**	**-**	**SF**	**9,240**
	Geotextile Drainage Mat	-	SF	9,240
[07 03 04 06]	**Weep Holes**	**-**	**EA**	**66**
	3" PVC Pipe	-	LF	132
	3" Steel Grate	-	EA	66
[07 03 04 07]	**Underdrain Pipe**	**-**	**LF**	**660**
	6" Perforated PVC Pipe	-	LF	660
	Base Course	15%	CY	65
	Geotextile Fabric	5%	SY	501
[07 04]	**Fill Material**	**-**	**LS**	**1**
[07 04 01]	**Riprap**	**-**	**CY**	**4,743**
[07 04 01 02]	**Channel Revetment Riprap**	**-**	**CY**	**3,841**
	Riprap	15%	LCY	4,417
[07 04 01 03]	**Drop Structures Riprap**	**-**	**CY**	**902**
	Riprap	15%	LCY	1,037
[07 04 02]	**Gravel**	**-**	**CY**	**1,432**
[07 04 02 02]	**Channel Revetment Gravel**	**-**	**CY**	**1,280**
	Gravel	15%	LCY	1,472
[07 04 02 03]	**Drop Revetment Gravel**	**-**	**CY**	**152**
	Gravel	15%	LCY	175
[07 04 03]	**Filter Material**	**-**	**SY**	**5,720**
[07 04 03 01]	**Channel Revetment Geotextile**	**-**	**SY**	**5,121**
	Geotextile Fabric	5%	SY	5,377
[07 04 03 01]	**Drop Revetment Geotextile**	**-**	**SY**	**599**
	Geotextile Fabric	5%	SY	629
[07 04 04]	**Native Soil**	**-**	**CY**	**854**
[06 04 04 01]	**Channel Revetment Native Soil**	**-**	**CY**	**854**
	Native Soil	15%	CY	982
	Compaction	-	ECY	854
	Grading	-	BCY	854
	Water Truck for Compaction	-	ECY	854
[07 04 04 02]	**Channel Revetment Native Soil**	**-**	**CY**	**854**
	Fill from Stockpile	15%	CY	982

Lower Mission Creek
Work Breakdown Structure

MCACES Source Tag	Item	Waste/Loss Factor (%)	Unit of Measure	Quantity
	Compaction	-	CY	854
	Grading	-	CY	854
[07 05]	**Boulder Cluster**	**-**	**EA**	**2**
	Boulder Cluster	-	TON	66
[07 06]	**Access Ramps**	**-**	**CY**	**54**
	Concrete, Forms	-	SFC	540
	Concrete, Material	10%	CY	59
	Concrete, Placing	10%	CY	59
	Reinforcing Steel	-	TON	4.1
	Concrete Broom Finish	-	SF	324.0
[07 07]	**Fencing**	**-**	**LS**	**1**
[07 07 01]	**Safety Fence**	**-**	**LF**	**1,329**
	Railing	-	LF	1,329
[07 07 03]	**Access Gate**	**-**	**EA**	**1**
	Access Gate	-	EA	1
[07 08]	**PCC Gutter**	**-**	**LF**	**1,330**
	Concrete, Forms	-	SFC	554
	Concrete, Material	10%	CY	28.2
	Concrete, Placing	10%	CY	28.2
[07 08]	**Reinforced Gutter**	**-**	**LF**	**1,330**
	Concrete, Forms	-	SFC	554
	Concrete, Material	10%	CY	28.2
	Concrete, Placing	10%	CY	28.2
[07 09]	**Landscaping**	**-**	**LS**	**1**
	5 Gallon Trees	-	EA	3
	Tree Cuttings	-	EA	16
	Landscape Area	-	SF	10,645
	Landscape Maintenance	-	SF	10,645
	Irrigation	-	SF	10,645
[07 10]	**Diversion and Control of Water**	**-**	**LS**	**1**
	36" HDPE	-	LF	925
	Dewatering Line Maintenance	-	MO	9

Quantity Summary

REACH		Channel Grading Quantities				RIPRAP QUANTITIES																						
		EXC (WALL TO WALL, CY)	EXC (RIPRAP, CY)	EXTRA EXC (NOT INCL. RIPRAP, CY)	FILL (CY)	RIPRAP (CY)			GRAVEL (CY)			FILTER MATERIAL (SY)			NATIVE SOIL (CY)			CHANNEL STRUCTURE TO BE REMOVED (SF)			MISC CONCRETE TO BE REMOVED (SF)		100 LF BOULDER CLUSTER (EA)	ACCESS ROAD (CF OF CONCRETE)	DRIVEWAY APPROACH (EA)	SAFETY FENCE		ACCESS FENCE		FISH LADDERS (LF)
						TOE REVETMENT	CHANNEL REVETMENT	DROP STRUCTURES	TOE REVETMENT	CHANNEL REVETMENT	DROP STRUCTURES	TOE REVETMENT	CHANNEL REVETMENT	DROP STRUCTURES	TOE REVETMENT	CHANNEL REVETMENT	DROP STRUCTURES	GABION	RIPRAP	GROUTED ROCK	CONCRETE SLOPE	CONCRETE BAGS				LF FENCE	ACCESS GATES (EA)	LF FENCE	ACCESS GATES (EA)	
7	CASTILLO ST - DE LA GUERRA ST	2518	2216	1669.35	152	0.00	1119	301	0	373	51	0	2238	299	0	373	0	0.00	0.00	0.00	376.67	2159.34	0.00	1456.15	1.00	392.02			1.00	0.00
7	ORTEGA ST TO DE LA GUERRA ST	3515	2754	2248	151	0.00	1442	301	0	481	51	0	2883	299	0	481	0	0.00	2033.47	0.00	0.00	1006.77	2.00	0.00	0.00	936.86				0.00
6	BATH ST TO ORTEGA ST	2017	1625	1107	77	0.00	764	301	0	255	51	0	1528	299	0	255	0	1343.46	574.42	0.00	0.00	172.32	1.00	0.00	0.00	340.36		226.12		0.00
6	COTA ST TO BATH ST	1713	3224	648	16	0.00	1934	0	0	645	0	0	3869	0	0	645	0	0.00	0.00	2992.53	0.00	0.00	0.00	771.61	1.00	313.10			1.00	0.00
5	HALEY ST TO COTA ST	6319	2901	2764	21	0.00	1530	301	0	510	51	0	3059	299	0	510	0	0.00	0.00	1723.04	1904.67	1689.86	2.00	0.00	0.00	1080.36				0.00
4	GUTIERREZ ST TO HALEY ST	6659	2016	2448	14	0.00	999	301	0	333	51	0	1998	299	0	333	0	0.00	129.54	0.00	5343.59	0.00	1.00	0.00	0.00	986.45				0.00
3	US 101 TO GUTIERREZ ST	6080	2086	2010	57	0.00	1041	301	0	347	51	0	2081	299	0	347	0	0.00	3331.13	1368.31	2835.53	0.00	0.00	969.71	1.00	404.55				0.00
1B	MASON ST TO YANONALI ST	6675	782	0	62	545.56	0	0	236	0	0	873	0	0	0	0	0	264.45	0.00	0.00	441.17	1194.46	2.00	0.00	0.00	715.59				983.57
	Total	35496.00	17603.72	12893.52	550.00																									

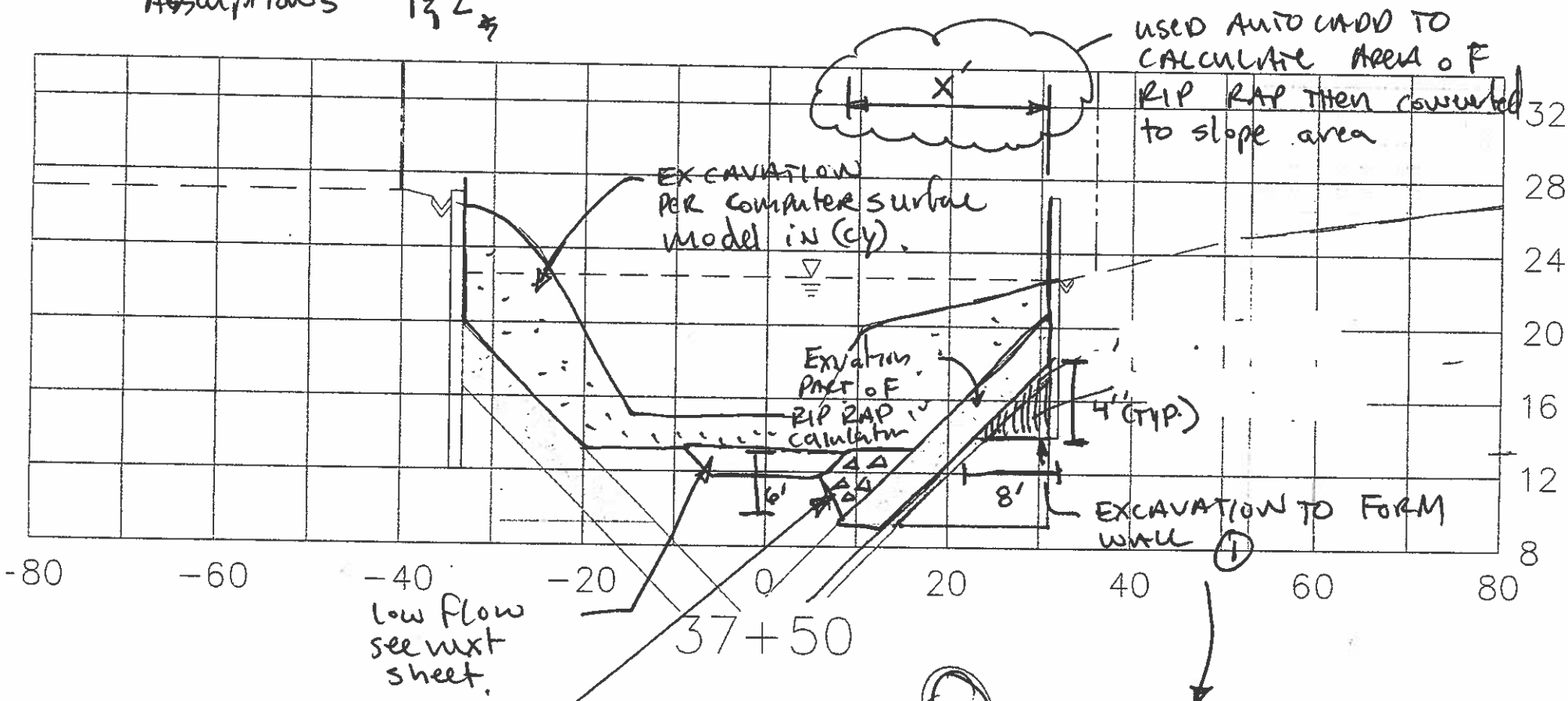
	Riprap (TON)*			Gravel (TON)*		
7	0	1679	451	0	560	76
7	0	2162	451	0	721	76
6	0	1146	451	0	382	76
6	0	2901	0	0	967	0
5	0	2295	451	0	765	76
4	0	1499	451	0	500	76
3	0	1561	451	0	520	76
1B	818	0	0	355	0	0

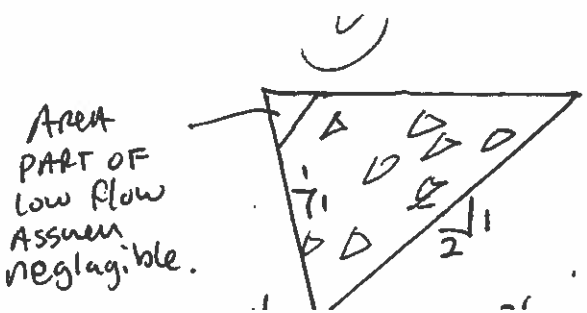
Assumes a weight of 1.5-tons per cubic yard of material

BASIS FOR ~~DESIGN~~ EXTRA EXC.

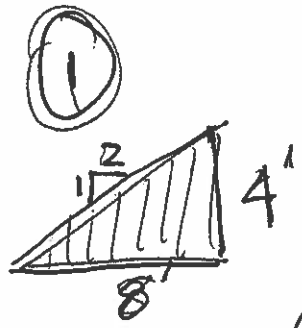
Assumptions on "Exc. CALCULATIONS" spread sheet.

Assumptions 1 & 2





6' $\forall = (6 \times 12 + 6 \times 6)\frac{1}{2}$



A = 16 sq. ft.

TOTAL AREA FOR 1 = 16 + 54 = 70

Structure Quantities

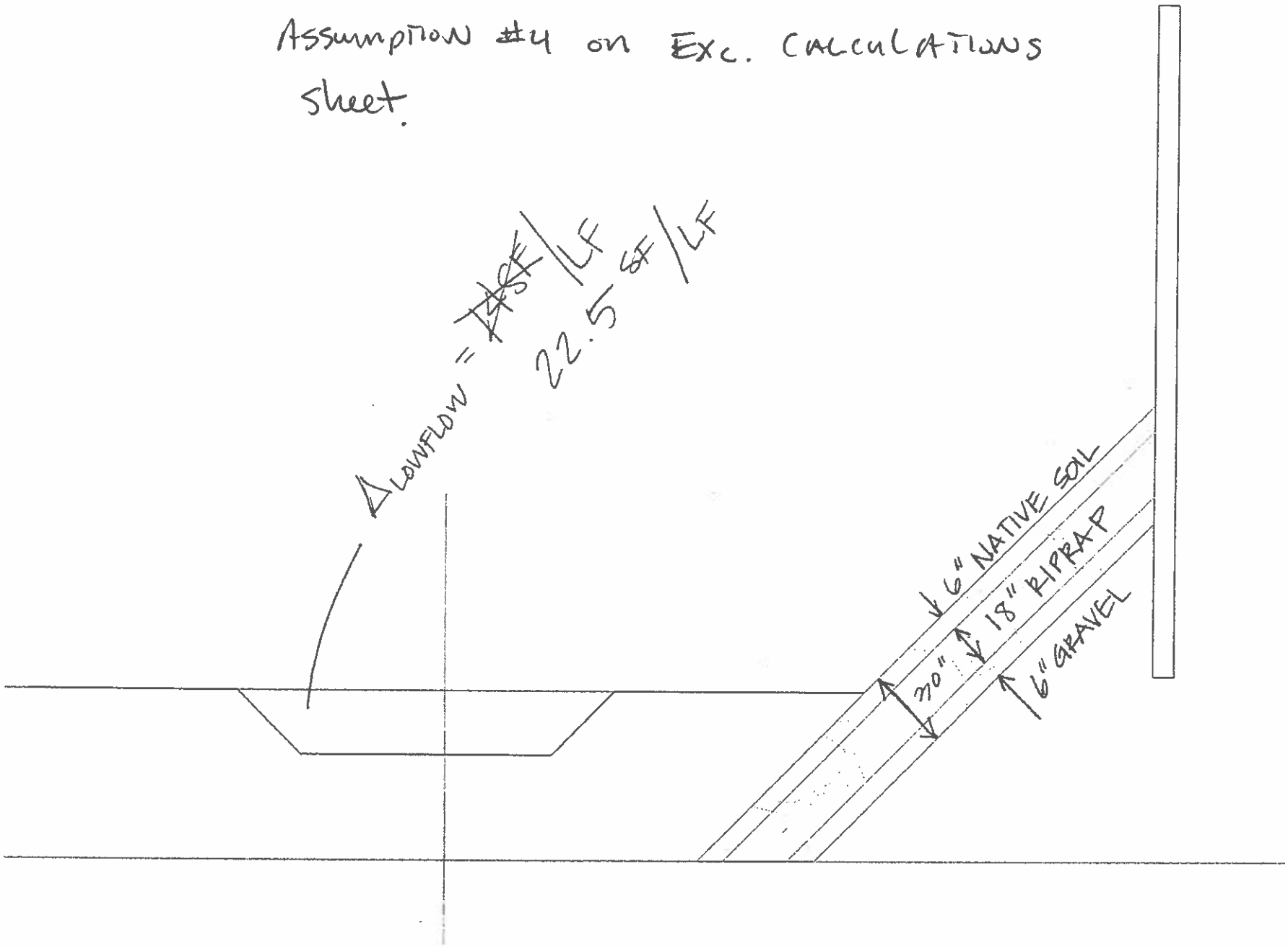
	LF of wall approx 6 ft below bank elevation*	EXC[1] (WALL[1], CF.)	LF of wall approx 3 ft below invert elevation*	EXC[2] (WALL[2], CF)	LF of exisitng wall[3*]	LF of low flow channel	EXC[4] (LOW FLOW, CF)	DROP STRUCTURE (#)	EXC[5] (DROP STRUCTURE, CF)	TOTAL EXTRA EXC (CF)
CASTILLO ST - DE LA GUERRA ST	448.00	31360.00	52.00	0.00	52.00	345.00	7762.50	1.00	5950.00	45072.50
ORTEGA ST TO DE LA GUERRA ST	660.00	46200.00	263.00	0.00	0.00	380.00	8550.00	1.00	5950.00	60700.00
BATH ST TO ORTEGA ST	292.00	20440.00	155.00	0.00	0.00	155.00	3487.50	1.00	5950.00	29877.50
COTA ST TO BATH ST	200.00	14000.00	108.00	0.00	0.00	155.00	3487.50	0.00	0.00	17487.50
HALEY ST TO COTA ST	827.00	57890.00	241.00	0.00	0.00	480.00	10800.00	1.00	5950.00	74640.00
GUTIERREZ ST TO HALEY ST	716.00	50120.00	258.00	0.00	39.00	445.00	10012.50	1.00	5950.00	66082.50
US 101 TO GUTIERREZ ST	597.00	41790.00	64.00	0.00	0.00	290.00	6525.00	1.00	5950.00	54265.00
MASON ST TO YANONALI ST	0.00	0.00	984.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

*WALL LENGTH BASED ON CHANNEL STATIONING

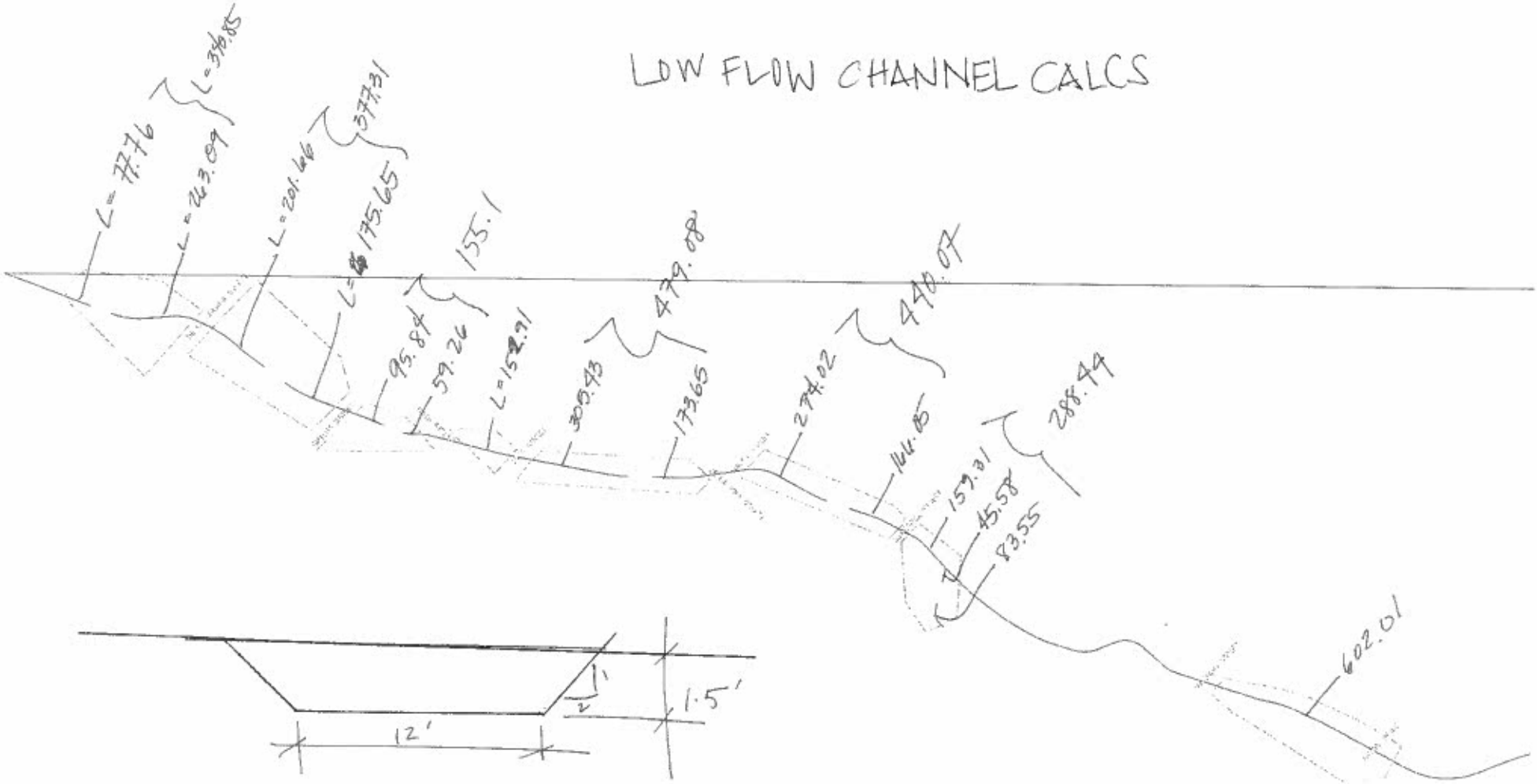
[1]Assume	70.00	SF/LF	
[2]Assume	0.00	SF/LF	Included in
[3]Assume	0.00	SF/LF	Riprap Calc
[4]Assume	22.50	SF/LF	
[5]Assume	5950.00	CF/DROP STRUCTURE	

TYPICAL SECTION

LOW FLOW EXCAVATION.
ASSUMPTION #4 ON EXC. CALCULATIONS SHEET.



LOW FLOW CHANNEL CALCS



A = 22.5 sq ft

Formliner Quantities

	Wall Area* (Formed, SF)	Formed Area (% of total)	Wall Area* (Unformed, SF)	Total Wall Area* (SF)
CASTILLO ST - DE LA GUERRA ST	11489	74.2%	3094	14583
ORTEGA ST TO DE LA GUERRA ST	17769		7096	24865
BATH ST TO ORTEGA ST	8051	79.0%	1939	9990
COTA ST TO BATH ST	7917		2317	10234
HALEY ST TO COTA ST	25765	75.7%	8249	34014
GUTIERREZ ST TO HALEY ST	20613	71.8%	8113	28726
US 101 TO GUTIERREZ ST	7627	77.3%	2236	9863
MASON ST TO YANONALI ST	21623	100.0%	0	21623
TOTAL	120854		33044	153898

*WALL AREA BASED ON CHANNEL STATIONING

Riprap Backup Quantities

					RIPRAP TOE REVETMENT (CF)				RIPRAP CHANNEL REVETMENT (CF)				RIPRAP DROP STRUCT (CF)				TOTAL QUANTITIES				
REACH	LENGTH (LF)	PLANVIEW AREA (SF)	INCLINED AREA[6] (SF)	DROP STRUCT (#)	18" RIPRAP[5] (CF)	6" GRAVEL[8] (CF)	FILTER FABRIC[7] (SF)	6" NATIVE SOIL (CF)	18" RIPRAP (CF)	6" GRAVEL (CF)	FILTER FABRIC (SF)	6" NATIVE SOIL (CF)	36" RIPRAP[9] (CF)	6" GRAVEL[10] (CF)	FILTER FABRIC[11] (SF)	6" NATIVE SOIL (CF)	RIPRAP (CF)	GRAVEL (CF)	FILTER FABRIC (SF)	NATIVE SOIL (CF)	Total CF (For EXC)
CASTILLO ST - DE LA GUERRA ST	410.00	18017.00	20143.00	1.00	0.00	0.00	0.00	0.00	30214.50	10071.50	20143.00	10071.50	8120.00	1365.00	2695.00	0.00	38334.50	11436.50	22838.00	10071.50	59842.50
ORTEGA ST TO DE LA GUERRA ST	461.00	23210.00	25949.00	1.00	0.00	0.00	0.00	0.00	38923.50	12974.50	25949.00	12974.50	8120.00	1365.00	2695.00	0.00	47043.50	14339.50	28644.00	12974.50	74357.50
BATH ST TO ORTEGA ST	224.00	12301.00	13753.00	1.00	0.00	0.00	0.00	0.00	20629.50	6876.50	13753.00	6876.50	8120.00	1365.00	2695.00	0.00	28749.50	8241.50	16448.00	6876.50	43867.50
COTA ST TO BATH ST	156.00	31142.00	34817.00	0.00	0.00	0.00	0.00	0.00	52225.50	17408.50	34817.00	17408.50	0.00	0.00	0.00	0.00	52225.50	17408.50	34817.00	17408.50	87042.50
HALEY ST TO COTA ST	555.00	24628.00	27534.00	1.00	0.00	0.00	0.00	0.00	41301.00	13767.00	27534.00	13767.00	8120.00	1365.00	2695.00	0.00	49421.00	15132.00	30229.00	13767.00	78320.00
GUTIERREZ ST TO HALEY ST	520.00	16085.00	17983.00	1.00	0.00	0.00	0.00	0.00	26974.50	8991.50	17983.00	8991.50	8120.00	1365.00	2695.00	0.00	35094.50	10356.50	20678.00	8991.50	54442.50
US 101 TO GUTIERREZ ST	347.00	16755.00	18732.00	1.00	0.00	0.00	0.00	0.00	28098.00	9366.00	18732.00	9366.00	8120.00	1365.00	2695.00	0.00	36218.00	10731.00	21427.00	9366.00	56315.00
MASON ST TO YANONALI ST	491.00	0.00	0.00	0.00	14730.00	6383.00	7856.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	14730.00	6383.00	7856.00	0.00	21113.00
TOTAL																	301816.50	94028.50	182937.00	79455.50	475300.50

[5]Assume 30.00 SF/LF (including both banks)

[6]Assume factor of 1.12 x planview area for 2:1 slope

[7]Assume 16.00 SF/LF (including both banks)

[8]Assume 13.00 SF/LF (including both banks)

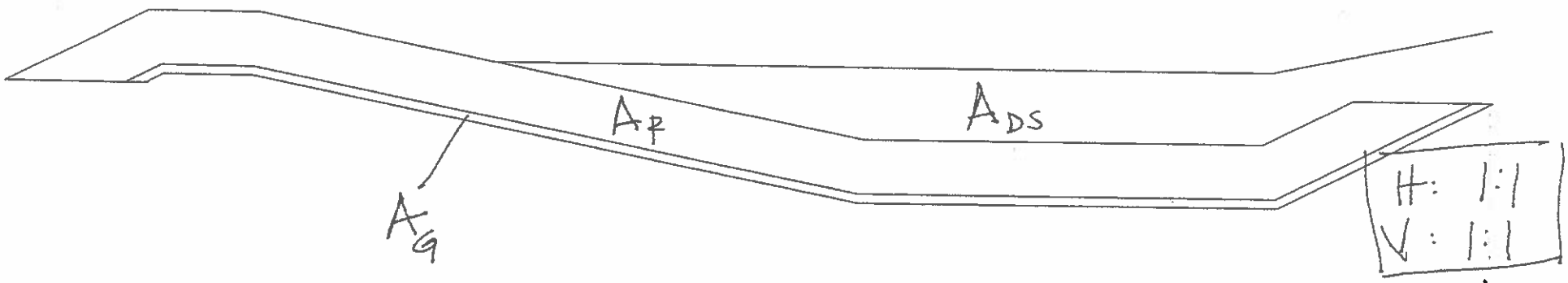
[9]Assume 8120.00 CF/DROP STRUCT

[10]Assume 1365.00 CF/DROP STRUCT

[11]Assume 2695.00 SF/DROP STRUCT

EXTRA EXC. FOR DROPSTRUCTURES
RIPRAP VOLUME DROPSTRUCTURES

* Assume channel width = 35



$A_{DS} = 170$ SF $\longrightarrow$ $V_{DS} = 170 \times 35 = \underline{5950}$ CF/DS * Assumption 5 on Exc. Calculat TAB

$A_P = \cancel{269.70}$ 231.2 SF $\rightarrow$ $\cancel{270}$ 232 SF $\quad V_R = \cancel{270}$ 232 $\times 35 = \underline{8120}$ CF/DS Assumption No. 9 on RIPRAP CA TAB.

$A_G = 38.52$ SF $\longrightarrow$ 39 SF $\quad V_G = 39 \times 35 = 1365$ CF/DS Assumption no 10 on RIPRAP CALC. TAB

$P_{MC} = 76.91_F \rightarrow 77$ LF $\times 35 = \underline{2695}$ SF/DS Assumption #11 on RIPRAP CALC. TAB

EXC. WALL to WALL

IN ~~FT~~ CY.

Current stratum: Vol1 – DeLaGuerra to Castillo
Site name = Overall Cutfill
Cut = 2518 Fill = 152
Net = 2366 CUT

Current stratum: Vol2 – Ortega to DeLaGuerra
Site name = Overall Cutfill
Cut = 3515 Fill = 151
Net = 3364 CUT

Current stratum: Vol3 – Bath to Ortega
Site name = Overall Cutfill
Cut = 2017 Fill = 77
Net = 1940 CUT

Current stratum: Vol4 – Cota to Bath
Site name = Overall Cutfill
Cut = 1713 Fill = 16
Net = 1698 CUT

Current stratum: Vol5 – Haley to Cota
Site name = Overall Cutfill
Cut = 6319 Fill = 21
Net = 6298 CUT

Current stratum: Vol6 – Gutierrez to Haley
Site name = Overall Cutfill
Cut = 6653 Fill = 14
Net = 6639 CUT

Current stratum: Vol7 – 101 to Gutierrez
Site name = Overall Cutfill
Cut = 6080 Fill = 57
Net = 6024 CUT

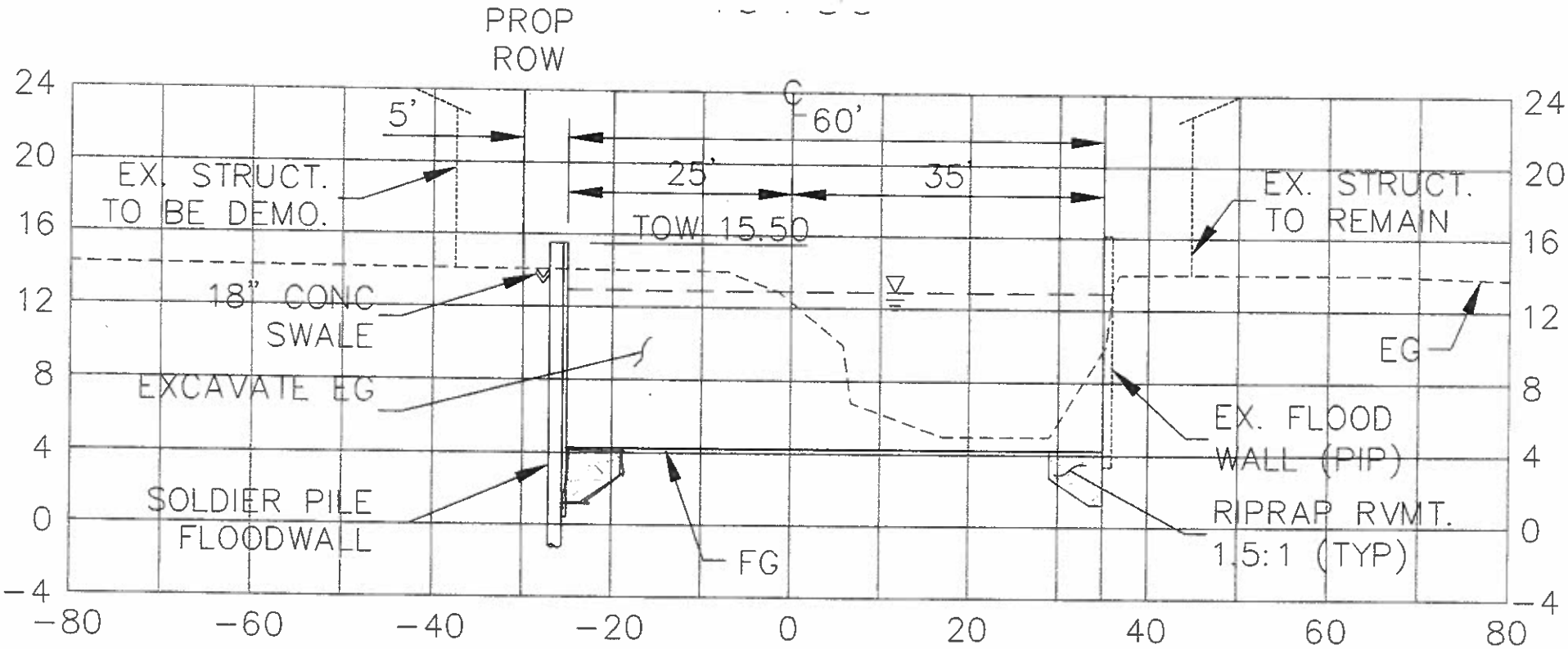
Current stratum: Vol8 – Mason to Yanonali
Site name = Overall Cutfill
Cut = 6675 Fill = 62
Net = 6613 CUT

Cut = 32972 Fill = 550
Net = 32422 CUT

TOE REVETMENT

For areas with existing walls or vertical walls.

RIP RAP QUANTIES FOR MASON TO Yanonali ST.



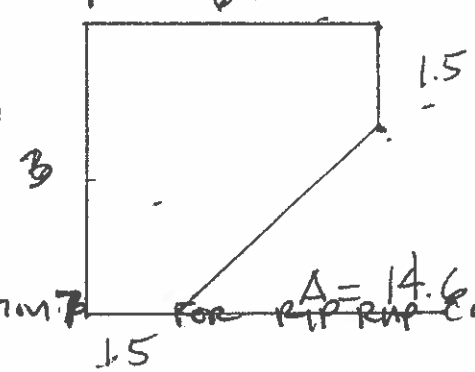
20+00

ASSUMPTION 5 FOR RIP RAP CALCULATIONS

$A_{BOTH\ BANKS} = 29.24\ SF/LF \rightarrow \boxed{30\ SF/LF}$

$P_{FILTER\ FABRIC} = 7.74\ SF/LF$

$P_{GRAVEL} = 2(4.74+1.5)\ X2 = \boxed{16\ SF/LF}$

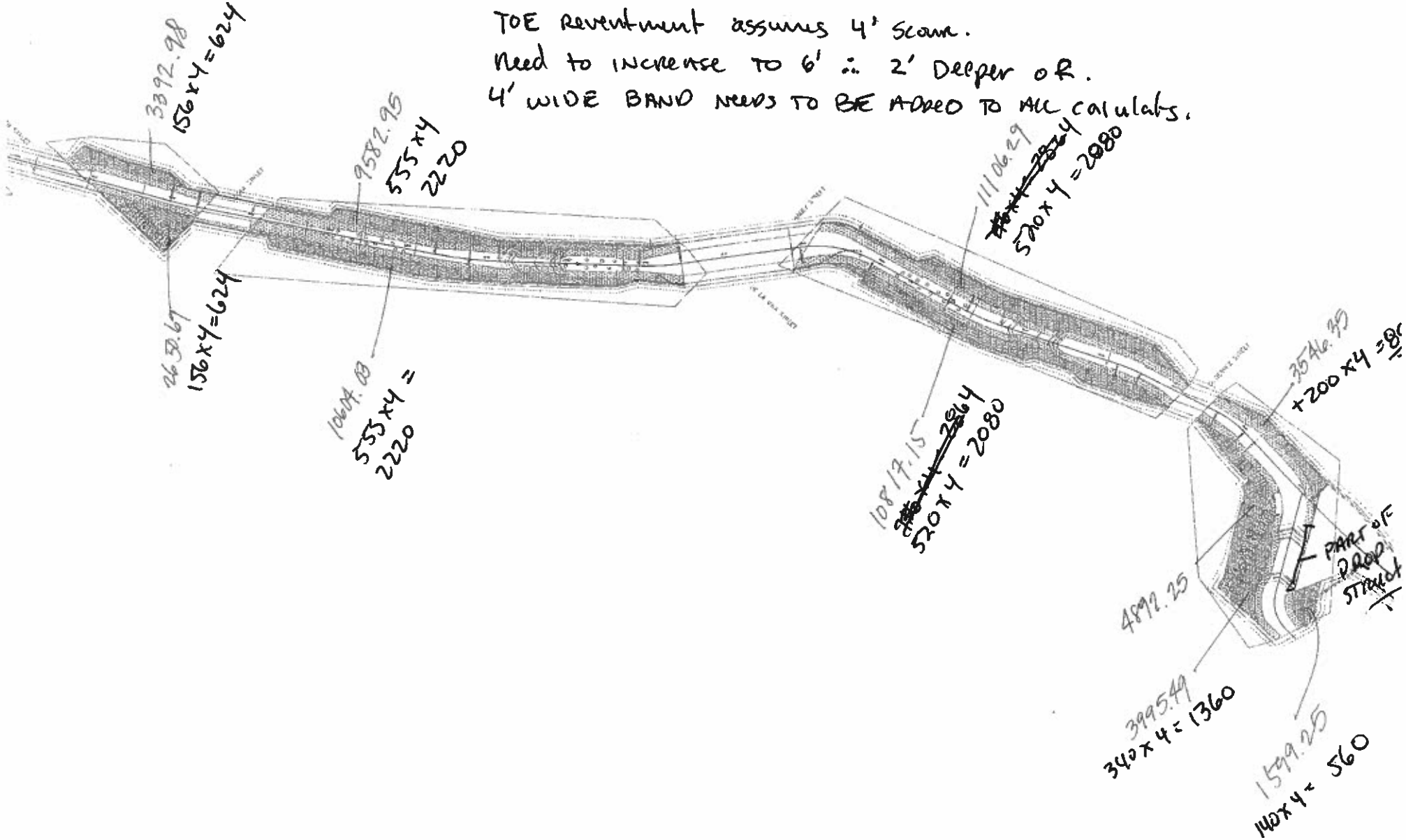


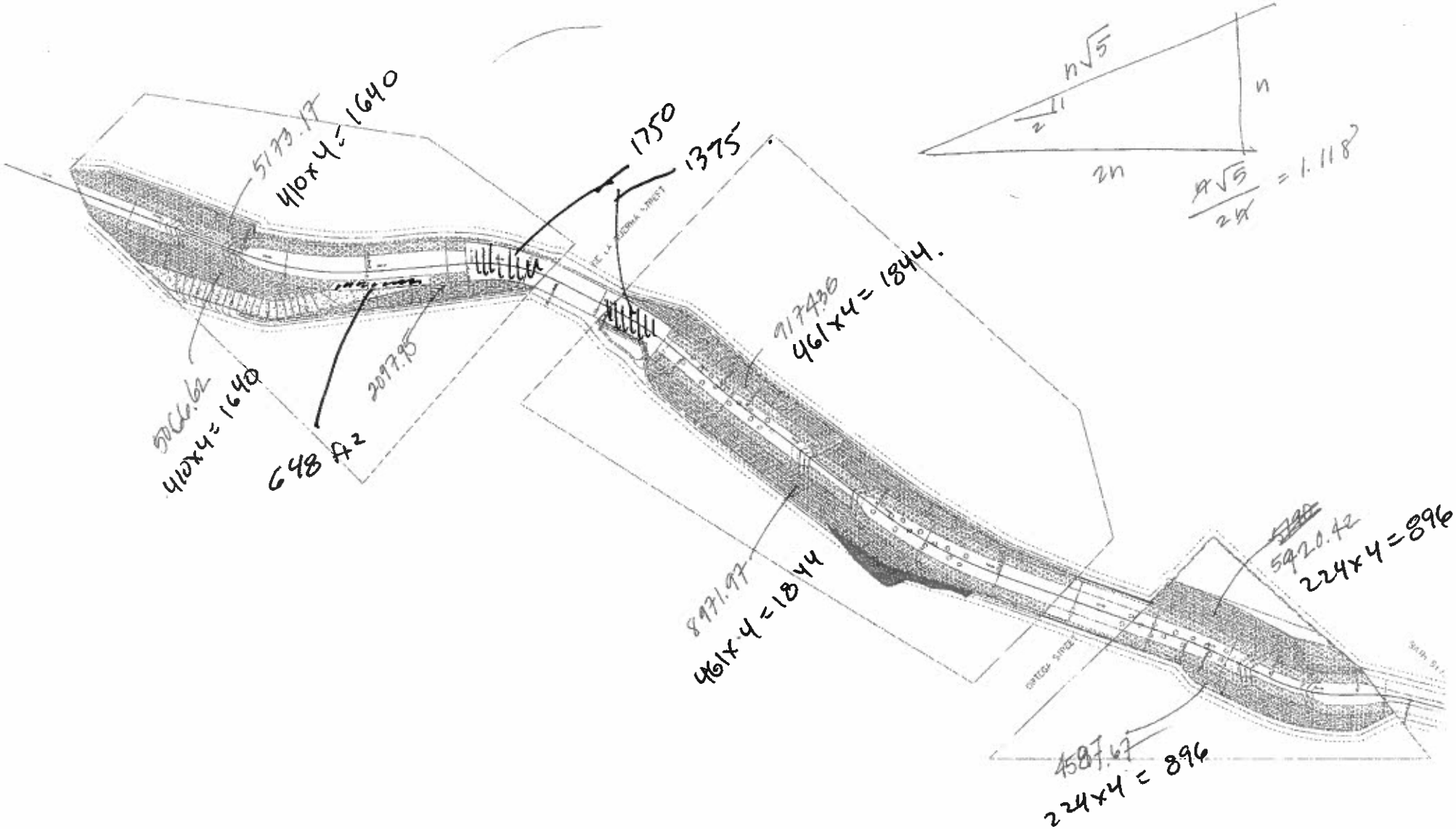
ASSUMPTION 7 FOR RIP RAP CALCULATION

A = 14.62 SF

RIPRAP SLOPE AREAS

TOE Revetment assumes 4' scour.
Need to increase to 6' ∴ 2' Deeper OR.
4' WIDE BAND NEEDS TO BE ADDED TO ALL calculations.

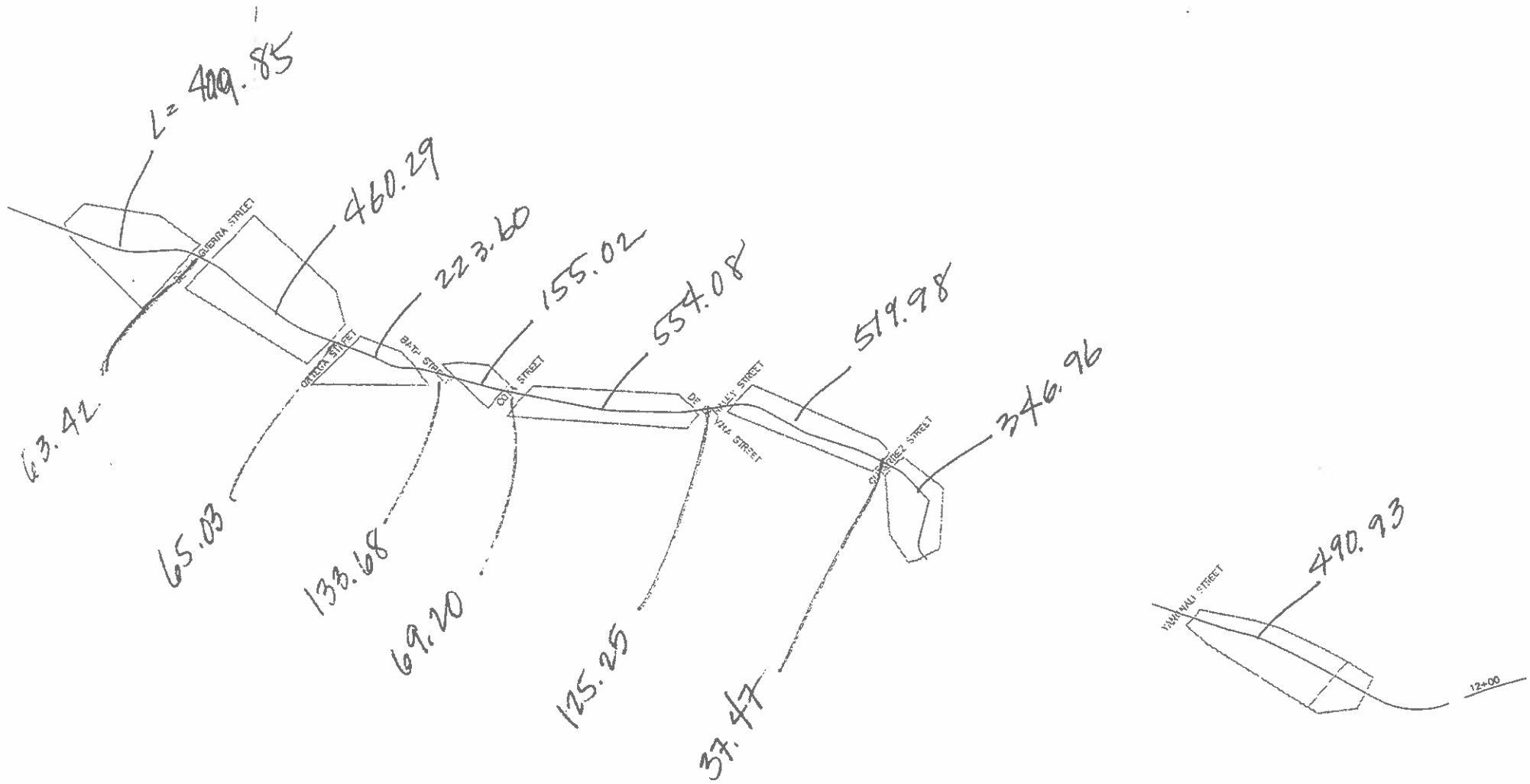



5173.17
410x4 = 1640
1750
1375
5066.62
410x4 = 1640
648 A2
2097.95
9174.36
461x4 = 1844.
8971.97
461x4 = 1844
5920.42
224x4 = 896
4587.67
224x4 = 896
n√5
n
2n
n√5 / 2n = 1.118

Reach Lengths

REACHES	
LOCATION	LENGTH (FT)
CASTILLO ST - DE LA GUERRA ST	410
ORTEGA ST TO DE LA GUERRA ST	461
BATH ST TO ORTEGA ST	224
COTA ST TO BATH ST	156
HALEY ST TO COTA ST	555
GUTIERREZ ST TO HALEY ST	520
US 101 TO GUTIERREZ ST	347
MASON ST TO YANONALI ST	491
BRIDGES	
DE LA GUERRA	64
ORTEGA	66
BATH	134
COTA	70
HALEY/DE LA VINA	126
GUTIERREZ	38

LENGTH – REACHES / BRIDGES



Demolition Quantity Summary

	MISC. CONCRETE TO BE REMOVED				TOTAL MISC CONCRETE TO BE REMOVED	EX. CHANNEL STRUCT TO BE REMOVED						TOTAL EX MISC CHANNEL STRUCT TO BE REMOVED
REACH	CONCRETE SLOPE (PLANVIEW, SF)	CONCRETE SLOPE (INCLINE, SF)	NON-REINFORCED CONCRETE (PLANVIEW, SF)	NON-REINFORCED CONCRETE (INCLINE, SF)		GABION (PLANVIEW, SF)	GABION (INCLINE, SF)	RIPRAP (PLANVIEW, SF)	RIPRAP (INCLINE, SF)	CONCRETE RIPRAP (PLANVIEW, SF)	CONCRETE RIPRAP (INCLINE, SF)	
CASTILLO ST - DE LA GUERRA ST	336.91	376.67	1931.43	2159.34	4804.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00
ORTEGA ST TO DE LA GUERRA ST	0.00	0.00	900.51	1006.77	1907.28	0.00	0.00	1818.85	2033.47	0.00	0.00	3852.32
BATH ST TO ORTEGA ST	0.00	0.00	154.13	172.32	326.45	1201.66	1343.46	513.79	574.42	0.00	0.00	1088.21
COTA ST TO BATH ST	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2676.68	2992.53	5669.21
HALEY ST TO COTA ST	1703.64	1904.67	1511.50	1689.86	6809.67	0.00	0.00	0.00	0.00	1541.18	1723.04	3264.22
GUTIERREZ ST TO HALEY ST	4779.60	5343.59	0.00	0.00	10123.19	0.00	0.00	115.87	129.54	0.00	0.00	245.41
US 101 TO GUTIERREZ ST	2536.25	2835.53	0.00	0.00	5371.78	0.00	0.00	2979.54	3331.13	1223.89	1368.31	8902.86
MASON ST TO YANONALI ST	394.61	441.17	1068.39	1194.46	3098.63	236.54	264.45	0.00	0.00	0.00	0.00	0.00

[6]Assume factor of 1.12 x planview area for 2:1 slope

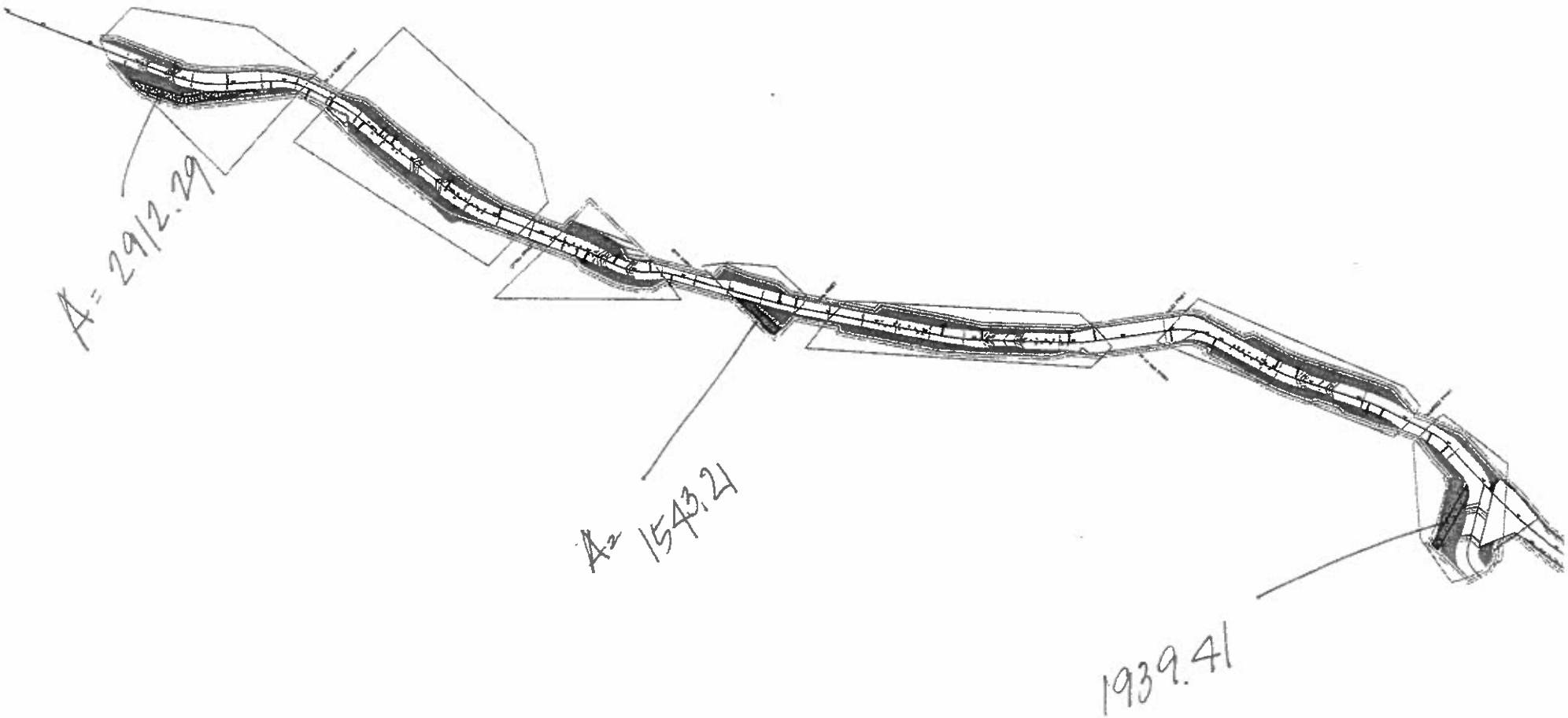
Access Road Summary

	SF OF ACCESS ROADS	CF OF CONCRETE
CASTILLO ST - DE LA GUERRA ST	2912.29	1456.145
ORTEGA ST TO DE LA GUERRA ST	0	0
BATH ST TO ORTEGA ST	0	0
COTA ST TO BATH ST	1543.21	771.605
HALEY ST TO COTA ST	0	0
GUTIERREZ ST TO HALEY ST	0	0
US 101 TO GUTIERREZ ST	1939.41	969.705
MASON ST TO YANONALI ST	0	0
TOTAL	6394.91	3197.455

*ASSUME 0.5 FEET THICK

ACCESS RDS

AREA CALULATIONS FOR
ACCESS ROADS TAB



TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Flood Walls
COMPUTED BY: SKV
CHECKED BY:

JOB NO.: T24732
DATE: 2/23/2011

Wall Dimensions by Type*

Wall Type	Design Height (H)	Max. Pile Spacing	Min. Embedment Depth (D)	Wall Height Above H
A-1	20	5	30	3
A-2	20	5	38	3
B-1	18	6	30	3
B-2	18	6	38	3
C-1	16	8	30	3
C-2	16	8	38	3
D-1	14	10	30	3
D-2	14	10	38	3

* All quantities are in feet.

Wall Lengths per Reach*

Wall Type	Reach 1B	Reach 03	Reach 04	Reach 05	Reach 06	Reach 07
A-1		114 lf	40 lf			
A-2					124 lf	32 lf
B-1			136 lf			
B-2			104 lf	668 lf	276 lf	222 lf
C-1			58 lf			
C-2				76 lf	80 lf	416 lf
D-1	796 lf	165 lf	592 lf			
D-2				348 lf	184 lf	660 lf

* Wall lengths were estimated from the design drawings.

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 1B
COMPUTED BY: SKV
CHECKED BY:

JOB NO.: T24732
DATE: 2/23/2011

[1B] Mason Street to Yanonali Street

[1B 03 01] Wall Type D-1

[1B 03 01 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 796 lf
Dist. Between Piles = 10 ft

# of Soldier Piles = **81 EA**

Caisson Pile Drilling
# of Piles = 81 ea
Depth per Pile = 47 ft

Total Drill Depth = **3,807 VLF**

Steel Piles
# of Piles = 81 ea
Depth per Pile = 47 ft

Total Drill Depth = **3,807 VLF**

Concrete Placing
Concrete Depth per Pile = 30 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 5.45 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 6.0 cy

Total Concrete Placement = **486 CY**

[1B 03 01 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 14 ft
# of Boards to Cover Wall = 21 ea
Wall Length = 796 ft
Total Board Feet = 78,356 bf
Board Feet per LF of Wall = 98 bf

Thousand Board Feet = **78 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 1B
COMPUTED BY: SKV
CHECKED BY:

JOB NO.: T24732
DATE: 2/23/2011

[1B 03 01 03] Concrete

Retaining Wall Forms
Height of Wall = 14 ft
Length of Wall = 796 lf

Square Feet of Contact Area = **11,144 SF**

Concrete Placement
Height of Wall = 14 ft
Length of Wall = 796 lf
Wall Width = 2.5 ft

Wall Concrete = **1,032 CY**

[1B 03 01 04] Reinforcing Steel

Steel Reinforcing
Concrete = 1,032 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **77.4 TON**

[1B 03 01 04] Drainage Mat

Drainage Mat
Height of Wall = 14 ft
Length of Wall = 796 lf

Square Feet of Drainage Mat = **11,144 SF**

[1B 03 01 05] Weep Holes

Piping
Length of Wall = 796 lf
Distance Between Weep Holes = 10 lf
Length of Pipe = 2 lf

Total Length of Pipe = **162 LF**

Steel Grates
Length of Wall = 796 lf
Distance Between Grates = 10 lf

# of Steel Grates = **81 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 1B
COMPUTED BY: SKV
CHECKED BY:

JOB NO.: T24732
DATE: 2/23/2011

[1B 03 01 07] Underdrain Pipe

Gravel Fill

Length of Pipe = 796 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf/lf

Gravel Fill = **67.8 CY**

Geotextile Fabric

Length of Pipe = 796 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf

Total Geotextile Fabric = **575 SY**

[1B 10] Fish Ledge

Concrete Forms

Height of Ledge = 5.0 in
Bottom Width = 20.0 in
Length of Ledge = 110 lf
SF of Forms per LF = 2.1 sf/lf

Square Feet of Contact Area = **231 SFC**

Concrete Placement

Height of Ledge = 5.0 in
Bottom Width = 20.0 in
Length of Ledge 110 lf
CY of Concrete per LF = 0.03 cy/lf

Total Concrete = **3.3 CY**

Reinforcing Steel

Steel Ration = 150 lb/cy
Concrete Required = 3.30 cy
LB per LF of Ledge = 4.50 lb/lf

Total Concrete = **.25 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 1B
COMPUTED BY: SKV
CHECKED BY:

JOB NO.: T24732
DATE: 2/23/2011

[1B 11] Reinforced Gutter

Concrete Forms

Height of Gutter = 2.5 in
# of Sides = 2 ea
Length of Gutter = 796 lf
SF of Forms per LF = .42 sf/lf

Square Feet of Contact Area = **334 SFC**

Concrete Placement

Height of Gutter = 2.5 in
Bottom Width = 30.0 in
Length of Ledge 796 lf
CY of Concrete per LF = 0.019 cy/lf

Total Concrete = **15.1 CY**

Reinforcing Steel

Steel Ration = 150 lb/cy
Concrete Required = 15.1 cy
LB per LF of Ledge = 2.85 lb/lf

Total Concrete = **1.13 TON**

[1B 12] Construct 54" RCP

Utility Beding

Length of Pipe = 40 lf
Bedding Depth = 1.0 ft
Bedding Width = 5.00 ft
CF per LF of Pipe = .19 cf/lf

Bedding Volume = **8 CY**

Fill from Stockpile

Length of Pipe = 40 lf
Depth = 10.0 ft
Width = 8.00 ft
Pipe Area = 15.9 sf
CF per LF of Pipe = 2.37 cf/lf

Fill Volume = **95 CY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[03] US 101 to Gutierrez Street

[03 03 01] Wall Type A-1

[03 03 01 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 114 lf
Dist. Between Piles = 5 ft

# of Soldier Piles = **24 EA**

Caisson Pile Drilling
# of Piles = 24 ea
Depth per Pile = 53 ft

Total Drill Depth = **1,272 VLF**

Steel Piles
# of Piles = 24 ea
Depth per Pile = 53 ft

Total Drill Depth = **1,272 VLF**

Concrete Placing
Concrete Depth per Pile = 30 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 5.45 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 6.0 cy

Total Concrete Placement = **144 CY**

[03 03 01 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 20 ft
# of Boards to Cover Wall = 30 ea
Wall Length = 114 ft
Total Board Feet = 16,031 bf
Board Feet per LF of Wall = 141 bf

Thousand Board Feet = **16 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[03 03 01 03] Concrete

Retaining Wall Forms
Height of Wall = 20 ft
Length of Wall = 114 lf

Square Feet of Contact Area = **2,280 SF**

Concrete Placement
Height of Wall = 20 ft
Length of Wall = 114 lf
Wall Width = 2.5 ft

Wall Concrete = **211 CY**

[03 03 01 04] Reinforcing Steel

Steel Reinforcing
Concrete = 211 cy
Ratio of Reinforcing Stee = 150 lbs/cy

Total Reinforcing Steel = **15.8 TON**

[03 03 01 04] Drainage Mat

Drainage Mat
Height of Wall = 20 ft
Length of Wall = 114 lf

Square Feet of Drainage Mat = **2,280 SF**

[03 03 01 05] Weep Holes

Piping
Length of Wall = 114 lf
Distance Between Weep Holes = 5 lf
Length of Pipe = 2 lf

Total Length of Pipe = **46 LF**

Steel Grates
Length of Wall = 114 lf
Distance Between Grates = 5 lf

# of Steel Grates **23 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[03 03 01 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 114 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf/lf

Gravel Fill = **9.7 CY**

Geotextile Fabric
Length of Pipe = 114 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf

Total Geotextile Fabric = **82 SY**

[03 03 02] Wall Type D-1
[03 03 02 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 165 lf
Dist. Between Piles = 10 ft

# of Soldier Piles = **17 EA**

Caisson Pile Drilling
# of Piles = 17 ea
Depth per Pile = 47 ft

Total Drill Depth = **799 VLF**

Steel Piles
# of Piles = 17 ea
Depth per Pile = 47 ft

Total Drill Depth = **799 VLF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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Concrete Placing

Concrete Depth per Pile = 30 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 5.45
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 6.0 cy

Total Concrete Placement = **102 CY**

[03 03 02 02] Timber Lagging

8" x 8" Timber Lagging

Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 14 ft
# of Boards to Cover Wall = 21 ea
Wall Length = 165 ft
Total Board Feet = 16,242 bf
Board Feet per LF of Wall = 98 bf

Thousand Board Feet = **16.2 MBF**

[03 03 02 03] Concrete

Retaining Wall Forms

Height of Wall = 14 ft
Length of Wall = 165 lf

Square Feet of Contact Area = **2,310 SF**

Concrete Placement

Height of Wall = 14 ft
Length of Wall = 165 lf
Wall Width = 2.5 ft

Wall Concrete = **214 CY**

[03 03 02 04] Reinforcing Steel

Steel Reinforcing

Concrete = 214 cy
Ratio of Reinforcing Stee = 150 lbs/cy

Total Reinforcing Steel = **16.0 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[03 03 02 04] Drainage Mat

Drainage Mat
Height of Wall = 14 ft
Length of Wall = 165 lf

Square Feet of Drainage Mat = **2,310 SF**

[03 03 02 05] Weep Holes

Piping
Length of Wall = 165 lf
Distance Between Weep Holes = 10 lf
Length of Pipe = 2 lf

Total Lengthof Pipe = **32 LF**

Steel Grates
Length of Wall = 165 lf
Distance Between Grates = 10 lf

# of Steel Grates **16 EA**

[03 03 02 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 165 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 ft

Gravel Fill = **14.1 CY**

Geotextile Fabric
Length of Pipe = 165 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf

Total Geotextile Fabric = **119 SY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[03 08] Reinforced Gutter

Concrete Forms

Height of Gutter = 2.5 in
# of Sides = 2 ea
Length of Gutter = 279 lf
SF of Forms per LF = .42 sf/lf

Square Feet of Contact Area = **117 SFC**

Concrete Placement

Height of Gutter = 2.5 in
Bottom Width = 30.0 in
Length of Ledge 279 lf
CY of Concrete per LF = 0.019 cy/lf

Total Concrete = **5.3 CY**

Reinforcing Steel

Steel Ration = 150 lb/cy
Concrete Required = 5.3 cy
LB per LF of Ledge = 2.85 lb/lf

Total Concrete = **.40 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 4 JOB NO.: T24732
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[04] Gutierrez Street to Haley Street

[04 03 01] Wall Type A-1

[04 03 01 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 40 lf
Dist. Between Piles = 5 ft

# of Soldier Piles = **9 EA**

Caisson Pile Drilling
# of Piles = 9 ea
Depth per Pile = 53 ft

Total Drill Depth = **477 VLF**

Steel Piles
# of Piles = 9 ea
Depth per Pile = 53 ft

Total Drill Depth = **477 VLF**

Concrete Placing
Concrete Depth per Pile = 30 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 5.45 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 6.0 cy

Total Concrete Placement = **54 CY**

[04 03 01 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 20 ft
# of Boards to Cover Wall = 30 ea
Wall Length = 40 ft
Total Board Feet = 5,625 bf
Board Feet per LF of Wall = 141 bf

Thousand Board Feet = **5.6 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[04 03 01 03] Concrete

Retaining Wall Forms
Height of Wall = 20 ft
Length of Wall = 40 lf

Square Feet of Contact Area = **800 SF**

Concrete Placement
Height of Wall = 20 ft
Length of Wall = 40 lf
Wall Width = 2.5 ft

Wall Concrete = **74 CY**

[04 03 01 04] Reinforcing Steel

Steel Reinforcing
Concrete = 74 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **5.6 TON**

[04 03 01 04] Drainage Mat

Drainage Mat
Height of Wall = 20 ft
Length of Wall = 40 lf

Square Feet of Drainage Mat = **800 SF**

[04 03 01 05] Weep Holes

Piping
Length of Wall = 40 lf
Distance Between Weep Holes = 5 lf
Length of Pipe = 2 lf

Total Lengt of Pipe = **16 LF**

Steel Grates
Length of Wall = 40 lf
Distance Between Grates = 5 lf

# of Steel Grates **8 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 4
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[04 03 01 07] Underdrain Pipe

Gravel Fill

Length of Pipe = 40 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **3.4 CY**

Geotextile Fabric

Length of Pipe = 40 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **28.9 SY**

[04 03 02] Wall Type B-1
[04 03 02 01] Soldier Piles

Caisson Pile Drilling

Length of Wall = 136 lf
Dist. Between Piles = 6 ft

# of Soldier Piles = **24 EA**

Caisson Pile Drilling

# of Piles = 24 ea
Depth per Pile = 51 ft

Total Drill Depth = **1,224 VLF**

Steel Piles

# of Piles = 24 ea
Depth per Pile = 51 ft

Total Drill Depth = **1,224 VLF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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Concrete Placing

Concrete Depth per Pile = 30 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 5.45 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 6.0 cy

Total Concrete Placement = **144 CY**

[04 03 02 02] Timber Lagging

8" x 8" Timber Lagging

Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 18 ft
# of Boards to Cover Wall = 27 ea
Wall Length = 136 ft
Total Board Feet = 17,213 bf
Board Feet per LF of Wall = 127 bf

Thousand Board Feet = **17.3 MBF**

[04 03 02 03] Concrete

Retaining Wall Forms

Height of Wall = 18 ft
Length of Wall = 136 lf

Square Feet of Contact Area = **2,448 SF**

Concrete Placement

Height of Wall = 18 ft
Length of Wall = 136 lf
Wall Width = 2.5 ft

Wall Concrete = **227 CY**

[04 03 02 04] Reinforcing Steel

Steel Reinforcing

Concrete = 227 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **17.0 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[04 03 02 04] Drainage Mat

Drainage Mat
Height of Wall = 18 ft
Length of Wall = 136 lf

Square Feet of Drainage Mat = **2,448 SF**

[04 03 02 05] Weep Holes

Piping
Length of Wall = 136 lf
Distance Between Weep Holes = 6 lf
Length of Pipe = 2 lf

Total Length of Pipe = **46 LF**

Steel Grates
Length of Wall = 136 lf
Distance Between Grates = 6 lf

# of Steel Grates **23 EA**

[04 03 02 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 136 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **11.6 CY**

Geotextile Fabric
Length of Pipe = 136 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **98.2 SY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[04 03 03] Wall Type B-2
[04 03 03 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 104 lf
Dist. Between Piles = 6 ft

# of Soldier Piles = **18 EA**

Caisson Pile Drilling
# of Piles = 18 ea
Depth per Pile = 59 ft

Total Drill Depth = **1,062 VLF**

Steel Piles
# of Piles = 18 ea
Depth per Pile = 59 ft

Total Drill Depth = **1,062 VLF**

Concrete Placing
Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **137 CY**

[04 03 03 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 18 ft
# of Boards to Cover Wall = 27 ea
Wall Length = 104 ft
Total Board Feet = 13,163 bf
Board Feet per LF of Wall = 127 bf

Thousand Board Feet = **13.2 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 4 JOB NO.: T24732
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[04 03 03 03] Concrete

Retaining Wall Forms
Height of Wall = 18 ft
Length of Wall = 104 lf

Square Feet of Contact Area = **1,872 SF**

Concrete Placement
Height of Wall = 18 ft
Length of Wall = 104 lf
Wall Width = 2.5 ft

Wall Concrete = **173 CY**

[04 03 03 04] Reinforcing Steel

Steel Reinforcing
Concrete = 173 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **13.0 TON**

[04 03 03 04] Drainage Mat

Drainage Mat
Height of Wall = 18 ft
Length of Wall = 104 lf

Square Feet of Drainage Mat = **1,872 SF**

[04 03 03 05] Weep Holes

Piping
Length of Wall = 104 lf
Distance Between Weep Holes = 6 lf
Length of Pipe = 2 lf

Total Length of Pipe = **34 LF**

Steel Grates
Length of Wall = 104 lf
Distance Between Grates = 6 lf

# of Steel Grates **17 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[04 03 03 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 104 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **8.9 CY**

Geotextile Fabric
Length of Pipe = 104 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **75.1 SY**

[04 03 04] Wall Type C-1
[04 03 04 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 58 lf
Dist. Between Piles = 8 ft

# of Soldier Piles = **8 EA**

Caisson Pile Drilling
# of Piles = 8 ea
Depth per Pile = 49 ft

Total Drill Depth = **392 VLF**

Steel Piles
# of Piles = 8 ea
Depth per Pile = 49 ft

Total Drill Depth = **392 VLF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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Concrete Placing

Concrete Depth per Pile = 30 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 5.45 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 6.0 cy

Total Concrete Placement = **48 CY**

[04 03 04 02] Timber Lagging

8" x 8" Timber Lagging

Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 16 ft
# of Boards to Cover Wall = 24 ea
Wall Length = 58 ft
Total Board Feet = 6,525 bf
Board Feet per LF of Wall = 113 bf

Thousand Board Feet = **6.6 MBF**

[04 03 04 03] Concrete

Retaining Wall Forms

Height of Wall = 16 ft
Length of Wall = 58 lf

Square Feet of Contact Area = **928 SF**

Concrete Placement

Height of Wall = 16 ft
Length of Wall = 58 lf
Wall Width = 2.5 ft

Wall Concrete = **86 CY**

[04 03 04 04] Reinforcing Steel

Steel Reinforcing

Concrete = 86 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **6.4 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[04 03 04 04] Drainage Mat

Drainage Mat
Height of Wall = 16 ft
Length of Wall = 58 lf

Square Feet of Drainage Mat = **928 SF**

[04 03 04 05] Weep Holes

Piping
Length of Wall = 58 lf
Distance Between Weep Holes = 8 lf
Length of Pipe = 2 lf

Total Length of Pipe = **14 LF**

Steel Grates
Length of Wall = 58 lf
Distance Between Grates = 8 lf

# of Steel Grates **7 EA**

[04 03 04 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 58 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **4.9 CY**

Geotextile Fabric
Length of Pipe = 58 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **41.9 SY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[04 03 05] Wall Type D-1
[04 03 05 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 592 lf
Dist. Between Piles = 10 ft

# of Soldier Piles = **60 EA**

Caisson Pile Drilling
# of Piles = 60 ea
Depth per Pile = 47 ft

Total Drill Depth = **2,820 VLF**

Steel Piles
# of Piles = 60 ea
Depth per Pile = 47 ft

Total Drill Depth = **2,820 VLF**

Concrete Placing
Concrete Depth per Pile = 30 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 5.45 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 6.0 cy

Total Concrete Placement = **360 CY**

[04 03 05 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 14 ft
# of Boards to Cover Wall = 21 ea
Wall Length = 592 ft
Total Board Feet = 58,275 bf
Board Feet per LF of Wall = 98 bf

Thousand Board Feet = **58.0 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[04 03 05 03] Concrete

Retaining Wall Forms
Height of Wall = 14 ft
Length of Wall = 592 lf

Square Feet of Contact Area = **8,288 SF**

Concrete Placement
Height of Wall = 14 ft
Length of Wall = 592 lf
Wall Width = 2.5 ft

Wall Concrete = **767 CY**

[04 03 05 04] Reinforcing Steel

Steel Reinforcing
Concrete = 767 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **57.5 TON**

[04 03 05 04] Drainage Mat

Drainage Mat
Height of Wall = 14 ft
Length of Wall = 592 lf

Square Feet of Drainage Mat = **8,288 SF**

[04 03 05 05] Weep Holes

Piping
Length of Wall = 592 lf
Distance Between Weep Holes = 10 lf
Length of Pipe = 2 lf

Total Length of Pipe = **118 LF**

Steel Grates
Length of Wall = 592 lf
Distance Between Grates = 10 lf

# of Steel Grates **59 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 4 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[04 03 05 07] Underdrain Pipe

Gravel Fill

Length of Pipe = 592 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **50.4 CY**

Geotextile Fabric

Length of Pipe = 592 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **427.6 SY**

[04 08] Reinforced Gutter

Concrete Forms

Height of Gutter = 2.5 in
# of Sides = 2 ea
Length of Gutter = 930 lf
SF of Forms per LF = .42 sf/lf

Square Feet of Contact Area = **391 SFC**

Concrete Placement

Height of Gutter = 2.5 in
Bottom Width = 30.0 in
Length of Ledge 930 lf
CY of Concrete per LF = 0.019 cy/lf

Total Concrete = **17.7 CY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[05] Haley Street to Cota Street

[05 03 01] Wall Type B-2

[05 03 01 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 668 lf
Dist. Between Piles = 6 ft

# of Soldier Piles = **112 EA**

Caisson Pile Drilling
# of Piles = 112 ea
Depth per Pile = 59 ft

Total Drill Depth = **6,608 VLF**

Steel Piles
# of Piles = 112 ea
Depth per Pile = 59 ft

Total Drill Depth = **6,608 VLF**

Concrete Placing
Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **851 CY**

[05 03 01 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 18 ft
# of Boards to Cover Wall = 27 ea
Wall Length = 668 ft
Total Board Feet = 84,544 bf
Board Feet per LF of Wall = 127 bf

Thousand Board Feet = **84.5 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 5 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[05 03 01 03] Concrete

Retaining Wall Forms
Height of Wall = 18 ft
Length of Wall = 668 lf

Square Feet of Contact Area = **12,024 SF**

Concrete Placement
Height of Wall = 18 ft
Length of Wall = 668 lf
Wall Width = 2.5 ft

Wall Concrete = **1,113 CY**

[05 03 01 04] Reinforcing Steel

Steel Reinforcing
Concrete = 1,113 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **83.5 TON**

[05 03 01 04] Drainage Mat

Drainage Mat
Height of Wall = 18 ft
Length of Wall = 668 lf

Square Feet of Drainage Mat = **12,024 SF**

[05 03 01 05] Weep Holes

Piping
Length of Wall = 668 lf
Distance Between Weep Holes = 6 lf
Length of Pipe = 2 lf

Total Length of Pipe = **222 LF**

Steel Grates
Length of Wall = 668 lf
Distance Between Grates = 6 lf

# of Steel Grates **111 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 5 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[05 03 01 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 668 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **56.9 CY**

Geotextile Fabric
Length of Pipe = 668 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **482.4 SY**

[05 03 02] Wall Type C-2
[05 03 02 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 76 lf
Dist. Between Piles = 8 ft

# of Soldier Piles = **11 EA**

Caisson Pile Drilling
# of Piles = 11 ea
Depth per Pile = 57 ft

Total Drill Depth = **627 VLF**

Steel Piles
# of Piles = 11 ea
Depth per Pile = 57 ft

Total Drill Depth = **627 VLF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 5 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

Concrete Placing

Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **84 CY**

[05 03 02 02] Timber Lagging

8" x 8" Timber Lagging

Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 16 ft
# of Boards to Cover Wall = 24 ea
Wall Length = 76 ft
Total Board Feet = 8,550 bf
Board Feet per LF of Wall = 113 bf

Thousand Board Feet = **8.6 MBF**

[05 03 02 03] Concrete

Retaining Wall Forms

Height of Wall = 16 ft
Length of Wall = 76 lf

Square Feet of Contact Area = **1,216 SF**

Concrete Placement

Height of Wall = 16 ft
Length of Wall = 76 lf
Wall Width = 2.5 ft

Wall Concrete = **113 CY**

[05 03 02 04] Reinforcing Steel

Steel Reinforcing

Concrete = 113 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **8.4 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 5 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[05 03 02 04] Drainage Mat

Drainage Mats
Height of Wall = 16 ft
Length of Wall = 76 lf

Square Feet of Drainage Mat = **1,216 SF**

[05 03 02 05] Weep Holes

Piping
Length of Wall = 76 lf
Distance Between Weep Holes = 8 lf
Length of Pipe = 2 lf

Total Length of Pipe = **20 LF**

Steel Grates
Length of Wall = 76 lf
Distance Between Grates = 8 lf

# of Steel Grates **10 EA**

[05 03 02 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 76 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **6.5 CY**

Geotextile Fabric
Length of Pipe = 76 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **54.9 SY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 5 JOB NO.: T24732
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CHECKED BY:

[05 03 03] Wall Type D-2
[05 03 03 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 348 lf
Dist. Between Piles = 10 ft

# of Soldier Piles = **36 EA**

Caisson Pile Drilling
# of Piles = 36 ea
Depth per Pile = 55 ft

Total Drill Depth = **1,980 VLF**

Steel Piles
# of Piles = 36 ea
Depth per Pile = 55 ft

Total Drill Depth = **1,980 VLF**

Concrete Placing
Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **274 CY**

[05 03 03 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 14 ft
# of Boards to Cover Wall = 21 ea
Wall Length = 348 ft
Total Board Feet = 34,256 bf
Board Feet per LF of Wall = 98 bf

Thousand Board Feet = **34.3 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 5 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[05 03 03 03] Concrete

Retaining Wall Forms
Height of Wall = 14 ft
Length of Wall = 348 lf

Square Feet of Contact Area = **4,872 SF**

Concrete Placement
Height of Wall = 14 ft
Length of Wall = 348 lf
Wall Width = 2.5 ft

Wall Concrete = **451 CY**

[05 03 03 04] Reinforcing Steel

Steel Reinforcing
Concrete = 451 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **33.8 TON**

[05 03 03 04] Drainage Mat

Drainage Mat
Height of Wall = 14 ft
Length of Wall = 348 lf

Square Feet of Drainage Mat = **4,872 SF**

[05 03 03 05] Weep Holes

Piping
Length of Wall = 348 lf
Distance Between Weep Holes = 10 lf
Length of Pipe = 2 lf

Total Length of Pipe = **70 LF**

Steel Grates
Length of Wall = 348 lf
Distance Between Grates = 10 lf

# of Steel Grates **35 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 5 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[05 03 03 07] Underdrain Pipe

Gravel Fill

Length of Pipe = 348 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6")= .1963 sf
Total Area = 2.3 sf

Gravel Fill = **29.6 CY**

Geotextile Fabric

Length of Pipe = 348 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **251.3 SY**

[05 08] Reinforced Gutter

Concrete Forms

Height of Gutter = 2.5 in
# of Sides = 2 ea
Length of Gutter = 1,092 lf
SF of Forms per LF = .42 sf/lf

Square Feet of Contact Area = **459 SFC**

Concrete Placement

Height of Gutter = 2.5 in
Bottom Width = 30.0 in
Length of Ledge 1,092 lf
CY of Concrete per LF = 0.019 cy/lf

Total Concrete = **20.7 CY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6
COMPUTED BY: SKV
CHECKED BY:

JOB NO.: T24732
DATE: 2/23/2011

[06] Cota Street to Ortega Street

[06 03 01] Wall Type A-2

[06 03 01 01] Soldier Piles

Caisson Pile Drilling

Length of Wall = 124 lf
Dist. Between Piles = 5 ft

# of Soldier Piles = **26 EA**

Caisson Pile Drilling

# of Piles = 26 ea
Depth per Pile = 61 ft

Total Drill Depth = **1,586 VLF**

Steel Piles

# of Piles = 26 ea
Depth per Pile = 61 ft

Total Drill Depth = **1,586 VLF**

Concrete Placing

Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **198 CY**

[06 03 01 02] Timber Lagging

8" x 8" Timber Lagging

Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 20 ft
# of Boards to Cover Wall = 30 ea
Wall Length = 124 ft
Total Board Feet = 17,438 bf
Board Feet per LF of Wall = 141 bf

Thousand Board Feet = **17.4 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[06 03 01 03] Concrete

Retaining Wall Forms
Height of Wall = 20 ft
Length of Wall = 124 lf

Square Feet of Contact Area = **2,480 SF**

Concrete Placement
Height of Wall = 20 ft
Length of Wall = 124 lf
Wall Width = 2.5 ft

Wall Concrete = **230 CY**

[06 03 01 04] Reinforcing Steel

Steel Reinforcing
Concrete = 230 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **17.2 TON**

[06 03 01 04] Drainage Mat

Drainage Mat
Height of Wall = 20 ft
Length of Wall = 124 lf

Square Feet of Drainage Mat = **2,480 SF**

[06 03 01 05] Weep Holes

Piping
Length of Wall = 124 lf
Distance Between Weep Holes = 5 lf
Length of Pipe = 2 lf

Total Length of Pipe = **50 LF**

Steel Grates
Length of Wall = 124 lf
Distance Between Grates = 5 lf

# of Steel Grates = **25 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6
COMPUTED BY: SKV
CHECKED BY:

JOB NO.: T24732
DATE: 2/23/2011

[06 03 01 07] Underdrain Pipe

Gravel Fill

Length of Pipe = 124 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.30 sf

Gravel Fill = **10.6 CY**

Geotextile Fabric

Length of Pipe = 124 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **89.6 SY**

[06 03 02] Wall Type B-2
[06 03 02 01] Soldier Piles

Caisson Pile Drilling

Length of Wall = 276 lf
Dist. Between Piles = 6 ft

# of Soldier Piles = **47 EA**

Caisson Pile Drilling

# of Piles = 47 ea
Depth per Pile = 59 ft

Total Drill Depth = **2,773 VLF**

Steel Piles

# of Piles = 47 ea
Depth per Pile = 59 ft

Total Drill Depth = **2,773 VLF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

Concrete Placing

Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **357 CY**

[06 03 02 02] Timber Lagging

8" x 8" Timber Lagging

Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 18 ft
# of Boards to Cover Wall = 27 ea
Wall Length = 276 ft
Total Board Feet = 34,931 bf
Board Feet per LF of Wall = 127 bf

Thousand Board Feet = **34.9 MBF**

[06 03 02 03] Concrete

Retaining Wall Forms

Height of Wall = 18 ft
Length of Wall = 276 lf

Square Feet of Contact Area = **4,968 SF**

Concrete Placement

Height of Wall = 18 ft
Length of Wall = 276 lf
Wall Width = 2.5 ft

Wall Concrete = **460 CY**

[06 03 02 04] Reinforcing Steel

Steel Reinforcing

Concrete = 460 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **34.5 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[06 03 02 04] Drainage Mat

Drainage Mat
Height of Wall = 18 ft
Length of Wall = 276 lf

Square Feet of Drainage Mat = **4,968 SF**

[06 03 02 05] Weep Holes

Piping
Length of Wall = 276 lf
Distance Between Weep Holes = 6 lf
Length of Pipe = 2 lf

Total Length of Pipe = **92 LF**

Steel Grates
Length of Wall = 276 lf
Distance Between Grates = 6 lf

# of Steel Grates = **46 EA**

[06 03 02 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 276 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **23.5 CY**

Geotextile Fabric
Length of Pipe = 276 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **199.3 SY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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[06 03 03] Wall Type C-2
[06 03 03 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 80 lf
Dist. Between Piles = 8 ft

# of Soldier Piles = **11 EA**

Caisson Pile Drilling
# of Piles = 11 ea
Depth per Pile = 57 ft

Total Drill Depth = **627 VLF**

Steel Piles
# of Piles = 11 ea
Depth per Pile = 57 ft

Total Drill Depth = **627 VLF**

Concrete Placing
Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **84 CY**

[06 03 03 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 16 ft
# of Boards to Cover Wall = 24 ea
Wall Length = 80 ft
Total Board Feet = 9,000 bf
Board Feet per LF of Wall = 113 bf

Thousand Board Feet = **9.0 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[06 03 03 03] Concrete

Retaining Wall Forms
Height of Wall = 16 ft
Length of Wall = 80 lf

Square Feet of Contact Area = **1,280 SF**

Concrete Placement
Height of Wall = 16 ft
Length of Wall = 80 lf
Wall Width = 2.5 ft

Wall Concrete = **119 CY**

[06 03 03 04] Reinforcing Steel

Steel Reinforcing
Concrete = 119 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **8.9 TON**

[06 03 03 04] Drainage Mat

Drainage Mat
Height of Wall = 16 ft
Length of Wall = 80 lf

Square Feet of Drainage Mat = **1,280 SF**

[06 03 03 05] Weep Holes

Piping
Length of Wall = 80 lf
Distance Between Weep Holes = 8 lf
Length of Pipe = 2 lf

Total Length of Pipe = **20 LF**

Steel Grates
Length of Wall = 80 lf
Distance Between Grates = 8 lf

# of Steel Grates = **10 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6
COMPUTED BY: SKV
CHECKED BY:

JOB NO.: T24732
DATE: 2/23/2011

[06 03 03 07] Underdrain Pipe

Gravel Fill

Length of Pipe = 80 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **6.8 CY**

Geotextile Fabric

Length of Pipe = 80 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **57.8 SY**

[06 03 04] Wall Type D-2
[06 03 04 01] Soldier Piles

Caisson Pile Drilling

Length of Wall = 184 lf
Dist. Between Piles = 10 ft

# of Soldier Piles = **19 EA**

Caisson Pile Drilling

# of Piles = 19 ea
Depth per Pile = 55 ft

Total Drill Depth = **1,045 VLF**

Steel Piles

# of Piles = 19 ea
Depth per Pile = 55 ft

Total Drill Depth = **1,045 VLF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

Concrete Placing

Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **144 CY**

[06 03 04 02] Timber Lagging

8" x 8" Timber Lagging

Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 14 ft
# of Boards to Cover Wall = 21 ea
Wall Length = 184 ft
Total Board Feet = 18,113 bf
Board Feet per LF of Wall = 98 bf

Thousand Board Feet = **18.1 MBF**

[06 03 04 03] Concrete

Retaining Wall Forms

Height of Wall = 14 ft
Length of Wall = 184 lf

Square Feet of Contact Area = **2,576 SF**

Concrete Placement

Height of Wall = 14 ft
Length of Wall = 184 lf
Wall Width = 2.5 ft

Wall Concrete = **239 CY**

[06 03 04 04] Reinforcing Steel

Steel Reinforcing

Concrete = 239 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **17.9 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[06 03 04 04] Drainage Mat

Drainage Mat
Height of Wall = 14 ft
Length of Wall = 184 lf

Square Feet of Drainage Mat = **2,576 SF**

[06 03 04 05] Weep Holes

Piping
Length of Wall = 184 lf
Distance Between Weep Holes = 10 lf
Length of Pipe = 2 lf

Total Length of Pipe = **36 LF**

Steel Grates
Length of Wall = 184 lf
Distance Between Grates = 10 lf

# of Steel Grates = **18 EA**

[06 03 04 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 184 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **15.7 CY**

Geotextile Fabric
Length of Pipe = 184 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **132.9 SY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 6 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[06 08] Reinforced Gutter

Concrete Forms

Height of Gutter = 2.5 in
# of Sides = 2 ea
Length of Gutter = 664 lf
SF of Forms per LF = .42 sf/lf

Square Feet of Contact Area = **279 SFC**

Concrete Placement

Height of Gutter = 2.5 in
Bottom Width = 30.0 in
Length of Ledge 664 lf
CY of Concrete per LF = 0.019 cy/lf

Total Concrete = **12.6 CY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 7 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[07] Ortega Street to Canon Perdido Street

[07 03 01] Wall Type A-2

[07 03 01 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 32 lf
Dist. Between Piles = 5 ft

# of Soldier Piles = **7 EA**

Caisson Pile Drilling
# of Piles = 7 ea
Depth per Pile = 61 ft

Total Drill Depth = **427 VLF**

Steel Piles
# of Piles = 7 ea
Depth per Pile = 61 ft

Total Drill Depth = **427 VLF**

Concrete Placing
Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **53 CY**

[07 03 01 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 20 ft
# of Boards to Cover Wall = 30 ea
Wall Length = 32 ft
Total Board Feet = 4,500 bf
Board Feet per LF of Wall = 141 bf

Thousand Board Feet = **4.5 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 7 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[07 03 01 03] Concrete

Retaining Wall Forms
Height of Wall = 20 ft
Length of Wall = 32 lf

Square Feet of Contact Area = **640 SF**

Concrete Placement
Height of Wall = 20 ft
Length of Wall = 32 lf
Wall Width = 2.5 ft

Wall Concrete = **59 CY**

[07 03 01 04] Reinforcing Steel

Steel Reinforcing
Concrete = 59 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **4.4 TON**

[07 03 01 04] Drainage Mat

Drainage Mat
Height of Wall = 20 ft
Length of Wall = 32 lf

Square Feet of Drainage Mat = **640 SF**

[07 03 01 05] Weep Holes

Piping
Length of Wall = 32 lf
Distance Between Weep Holes = 5 lf
Length of Pipe = 2 lf

Total Length of Pipe = **12 LF**

Steel Grates
Length of Wall = 32 lf
Distance Between Grates = 5 lf

# of Steel Grates = **6 EA**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 7 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[07 03 01 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 32 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **2.7 CY**

Geotextile Fabric
Length of Pipe = 32 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **23.1 SY**

[07 03 02] Wall Type B-2
[07 03 02 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 222 lf
Dist. Between Piles = 6 ft

# of Soldier Piles = **38 EA**

Caisson Pile Drilling
# of Piles = 38 ea
Depth per Pile = 59 ft

Total Drill Depth = **2,242 VLF**

Steel Piles
# of Piles = 38 ea
Depth per Pile = 59 ft

Total Drill Depth = **2,242 VLF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 7 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

Concrete Placing

Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **289 CY**

[07 03 02 02] Timber Lagging

8" x 8" Timber Lagging

Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 18 ft
# of Boards to Cover Wall = 27 ea
Wall Length = 222 ft
Total Board Feet = 28,097 bf
Board Feet per LF of Wall = 127 bf

Thousand Board Feet = **28.1 MBF**

[07 03 02 03] Concrete

Retaining Wall Forms

Height of Wall = 18 ft
Length of Wall = 222 lf

Square Feet of Contact Area = **3,996 SF**

Concrete Placement

Height of Wall = 18 ft
Length of Wall = 222 lf
Wall Width = 2.5 ft

Wall Concrete = **370 CY**

[07 03 02 04] Reinforcing Steel

Steel Reinforcing

Concrete = 370 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **27.8 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 7 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[07 03 02 04] Drainage Mat

Drainage Mat
Height of Wall = 18 ft
Length of Wall = 222 lf

Square Feet of Drainage Mat = **3,996 SF**

[07 03 02 05] Weep Holes

Piping
Length of Wall = 222 lf
Distance Between Weep Holes = 6 lf
Length of Pipe = 2 lf

Total Length of Pipe = **74 LF**

Steel Grates
Length of Wall = 222 lf
Distance Between Grates = 6 lf

# of Steel Grates = **37 EA**

[07 03 02 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 222 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **18.9 CY**

Geotextile Fabric
Length of Pipe = 222 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **160.3 SY**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 7 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[07 03 03] Wall Type C-2
[07 03 03 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 416 lf
Dist. Between Piles = 8 ft

# of Soldier Piles = **53 EA**

Caisson Pile Drilling
# of Piles = 53 ea
Depth per Pile = 57 ft

Total Drill Depth = **3,021 VLF**

Steel Piles
# of Piles = 53 ea
Depth per Pile = 57 ft

Total Drill Depth = **3,021 VLF**

Concrete Placing
Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **403 CY**

[07 03 03 02] Timber Lagging

8" x 8" Timber Lagging
Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 16 ft
# of Boards to Cover Wall = 24 ea
Wall Length = 416 ft
Total Board Feet = 46,800 bf
Board Feet per LF of Wall = 113 bf

Thousand Board Feet = **46.8 MBF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 7 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[07 03 03 03] Concrete

Retaining Wall Forms
Height of Wall = 16 ft
Length of Wall = 416 lf

Square Feet of Contact Area = **6,656 SF**

Concrete Placement
Height of Wall = 16 ft
Length of Wall = 416 lf
Wall Width = 2.5 ft

Wall Concrete = **616 CY**

[07 03 03 04] Reinforcing Steel

Steel Reinforcing
Concrete = 616 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **46.2 TON**

[07 03 03 04] Drainage Mat

Drainage Mat
Height of Wall = 16 ft
Length of Wall = 416 lf

Square Feet of Drainage Mat = **6,656 SF**

[07 03 03 05] Weep Holes

Piping
Length of Wall = 416 lf
Distance Between Weep Holes = 8 lf
Length of Pipe = 2 lf

Total Length of Pipe = **104 LF**

Steel Grates
Length of Wall = 416 lf
Distance Between Grates = 8 lf

# of Steel Grates = **52 EA**

TETRA TECH, INC.

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[07 03 03 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 416 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.3 sf

Gravel Fill = **35.4 CY**

Geotextile Fabric
Length of Pipe = 416 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **300.4 SY**

[07 03 04] Wall Type D-2
[07 03 04 01] Soldier Piles

Caisson Pile Drilling
Length of Wall = 660 lf
Dist. Between Piles = 10 ft

# of Soldier Piles = **67 EA**

Caisson Pile Drilling
# of Piles = 67 ea
Depth per Pile = 55 ft

Total Drill Depth = **3,685 VLF**

Steel Piles
# of Piles = 67 ea
Depth per Pile = 55 ft

Total Drill Depth = **3,685 VLF**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

Concrete Placing

Concrete Depth per Pile = 38 ft
Diameter of Caisson = 30 in
Concrete Per Pile = 6.91 cy
Waste/Loss Factor = 10%
Total Concrete Used Per Pile = 7.6 cy

Total Concrete Placement = **509 CY**

[07 03 04 02] Timber Lagging

8" x 8" Timber Lagging

Actual Height = 7.5 in
Actual Depth = 7.5 in
Wall Height = 14 ft
# of Boards to Cover Wall = 21 ea
Wall Length = 660 ft
Total Board Feet = 64,969 bf
Board Feet per LF of Wall = 98 bf

Thousand Board Feet = **65.0 MBF**

[07 03 04 03] Concrete

Retaining Wall Forms

Height of Wall = 14 ft
Length of Wall = 660 lf

Square Feet of Contact Area = **9,240 SF**

Concrete Placement

Height of Wall = 14 ft
Length of Wall = 660 lf
Wall Width = 2.5 ft

Wall Concrete = **856 CY**

[07 03 04 04] Reinforcing Steel

Steel Reinforcing

Concrete = 856 cy
Ratio of Reinforcing Steel = 150 lbs/cy

Total Reinforcing Steel = **64.2 TON**

TETRA TECH, INC.

PROJECT: Lower Mission Creek
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COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

[07 03 04 04] Drainage Mat

Drainage Mat
Height of Wall = 14 ft
Length of Wall = 660 lf

Square Feet of Drainage Mat = **9,240 SF**

[07 03 04 05] Weep Holes

Piping
Length of Wall = 660 lf
Distance Between Weep Holes = 10 lf
Length of Pipe = 2 lf

Total Length of Pipe = **132 LF**

Steel Grates
Length of Wall = 660 lf
Distance Between Grates = 10 lf

# of Steel Grates = **66 EA**

[07 03 04 07] Underdrain Pipe

Gravel Fill
Length of Pipe = 660 lf
Height = 2.0 ft
Width = 1.25 ft
Area of Pipe (6") = .1963 sf
Total Area = 2.30 sf

Gravel Fill = **56.2 CY**

Geotextile Fabric
Length of Pipe = 660 lf
Height = 2.0 ft
Width = 1.25 ft
SF per LF of Pipe = 6.50 sf/lf

Total Geotextile Fabric = **476.7 SY**

[07 08] Reinforced Gutter

Concrete Forms
Height of Gutter = 2.5 in
# of Sides = 2 ea
Length of Gutter = 1,330 lf

TETRA TECH, INC.

PROJECT: Lower Mission Creek
DETAIL: Detailed Quantity Take-Offs for Reach 7 JOB NO.: T24732
COMPUTED BY: SKV DATE: 2/23/2011
CHECKED BY:

SF of Forms per LF = .42 sf/lf

Square Feet of Contact Area = **559 SFC**

Concrete Placement

Height of Gutter = 2.5 in
Bottom Width = 30.0 in
Length of Ledge 1,330 lf
CY of Concrete per LF = 0.019 cy/lf

Total Concrete = **25.3 CY**

TETRA TECH, INC.

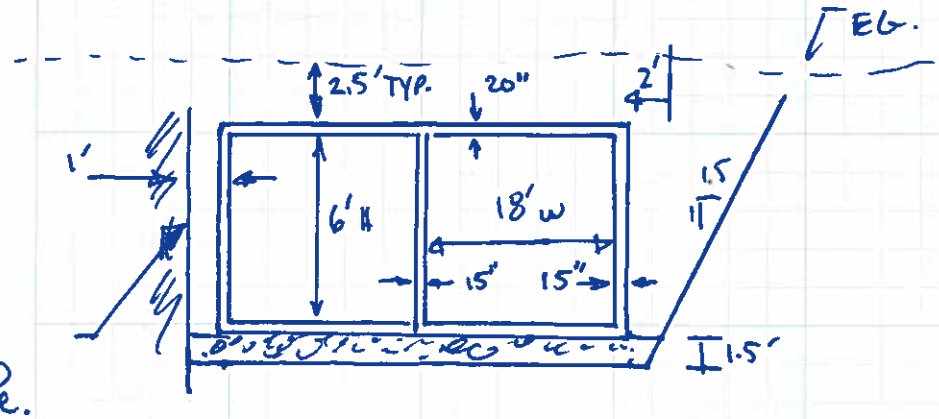
CLIENT _____ JOB NO. _____ PAGE 1 of 2

PROJECT LMC COMPUTED BY _____ DATE _____

DETAIL Beach Zon. CHECKED BY _____ DATE _____

① RCB culvert. DBL cell 18'w x 6'H

190 LF



EX. OR PROPOSED BRIDGE.

EXCAVATION QTY's

$D = 2.5' + 20'' + 6' + 20'' + 1.5' = 13.33'$

$W_B = 1' + 18' + 18' + 15''(3) + 2' = 42.75'$

$W_T = W_B + 1.5 * 13.33 = 62.75'$

$W_{AVE} = \frac{62.75' + 42.75}{2} = 52.75$ $\forall_{LF} = 52.75' * 13.33' = 703$ cf $\approx$ 26 cy/LF.

Excav. = 26 * 190 . 4,948 cy

$(20'' + 6' + 20'') * (18' + 18' + 3(15''))$

$\forall_{RCB} = 371$ ft³/LF = 13.75 cy/LF = 2610

fill = excav. − $\forall_{RCB}$ − $\forall_{BASE}$

$V_{BASE} = 1.5' * 42.75 = 2.4$ cy/LF

= 451 cy. base.

fill = 1,886 cy

ROCK BASE = 451 cy

concrete = $\forall_{RCB} - \forall_{cells}$ = 371 ft³/LF − (6 * 36') = 155 ft³/LF = 5.74 cy/LF

Concrete $\forall$ = 1090 cy

TETRA TECH, INC.

CLIENT _____ JOB NO. _____ PAGE 2 of 2

PROJECT LMC COMPUTED BY _____ DATE _____

DETAIL Reach 2A CHECKED BY _____ DATE _____

- LANDSCAPE = 80' W x 40' WIDE △ = 1600 sq. ft. SRUBS & grass.
- 2 LOW POINT CATCH BASINS
- Assume 10' OF 24" RCP
- WATERLINE TO Be abondoned.
- ELECTRICAL TO BE RELOCATED By SCE @ thier cost.
- FIBER OPTIC LINE. TO BE RELOCATED ABOVE RCB.
  * cost for RELOCATION performed w/ RAILROAD SEGMENT.
- 100 LF of CURB Removal & Replacement
- 250 sq. FT OF R&R EXISTING A.C.
- NOTE. CITY TO REPLACE EX. CHAPALLA/Yanonali STREET BRIDGE PRIOR TO or @ SAME TIME of REACH 2A.
  ALL STREET IMP. TO Be Performed with BRIDGE & Included in BRIDGE COST, which is a seperate project From the LMC PROJECT.

REACH 2B QUANTITIES

BYPASS CULVERT. upstream RR.

SANTA BARBARA COUNTY

PROPOSED ENGINEER'S ESTIMATE OF PROBABLE COST
FOR
LOWER MISSION CREEK

HDR
upstream RR TO Diversion structure connect TO TE PUMPS

No	Description	Quantity	Units	Unit Price	Total Amount
1	Mobilization	1	LS	$69,000.00	$69,000.00
2	Storm Water Pollution Prevention Plan	1	LS	$8,000.00	$8,000.00
3	Water Pollution Control	1	LS	$15,000.00	$15,000.00
4	Construction Area Signs	1	LS	$2,500.00	$2,500.00
5	Traffic Control	1	LS	$10,000.00	$10,000.00
6	Shoring of Excavation	10,000	SF	$10.00	$100,000.00
7	Clearing and Grubbing	1	AC	$5,000.00	$5,000.00
8	Additional Subgrade Overexcavation	100	CY	$30.00	$3,000.00
9	Structure Removals Per Plan	1	LS	$9,000.00	$9,000.00
10	Unclassified Excavation	14,800	CY	$30.00	$444,000.00
11	Structural Concrete	2,073	CY	$550.00	$1,140,150.00
12	Structural Steel	357,954	LBS	$0.65	$232,670.10
13	12" PVC Storm Drain SDR 35	77	LF	$20.00	$1,540.00
14	15" PVC Strom Drain SDR 35	102	LF	$30.00	$3,060.00
15	18" RCP Storm Drain (D-load Per Plan)	50	LF	$100.00	$5,000.00
16	12" PVC Elbow SDR 35	3	EA	$25.00	$75.00
17	15" PVC Elbow SDR 35	2	EA	$50.00	$100.00
18	Install Pipe Hangers	24	EA	$60.00	$1,440.00
19	Remove and Replace Water Main	1	LS	$22,000.00	$22,000.00
20	Manhole per SPPWC std. 321-1.	2	EA	$4,000.00	$8,000.00

REACH 2B QUANTITIES

SANTA BARBARA COUNTY

PROPOSED ENGINEER'S ESTIMATE OF PROBABLE COST
FOR
LOWER MISSION CREEK

No	Description	Quantity	Units	Unit Price	Total Amount
21	Manhole per SPPWC std. 323-1	1	EA	$2,500.00	$2,500.00
22	Monolithic Connection per SPPWC std. 308-1	1	EA	$2,000.00	$2,000.00
23	Concrete Collar	3	EA	$1,200.00	$3,600.00
24	Concrete Slurry	2.3	CY	$490.00	$1,127.00
25	Flap Gate Inlet Per Detail	2	EA	$2,000.00	$4,000.00
26	Install Bulkhead	1	EA	$2,500.00	$2,500.00
27	Construct Debris Rack	1	LS	$23,000.00	$23,000.00
28	Subdrain System	548	LF	$150.00	$82,200.00
29	Remove and Replace Curb And Gutter	512	LF	$30.00	$15,360.00
30	Remove and Replace PCC Pavement and Agg. Base	17,408	SF	$7.30	$127,078.40
31	Remove and Replace AC Pavement and Agg. Base	4,550	SF	$4.30	$19,565.00
32	Striping	1	LS	$10,000.00	$10,000.00
33	Install Chain Link Fence	363	LF	$20.00	$7,260.00
34	Landscape Irrigation	1	LS	$12,000.00	$12,000.00

CONSTRUCTION COST $2,391,726

LANDSCAPE QUANTITIES

West of Mason St

Est.Quantity	Unit	Description	Unit Cost	Item Cost	Total
1	EA.	24" box trees	$350.00	$350.00	
0	EA.	5 gal trees	$25.00	$0.00	
0	EA.	tree cuttings	$5.00	$0.00	
1251	SF	landscape area	$3.50	$4,378.50	
1251	SF	irrigation	$1.50	$1,876.50	
					$6,605.00

Between Hwy 101and Gutierrez St

Est.Quantity	Unit	Description	Unit Cost	Item Cost	Total
0	EA.	24" box trees	$350.00	$0.00	
1	EA.	5 gal trees	$25.00	$25.00	
20	EA.	tree cuttings	$5.00	$100.00	
7665	SF	landscape area	$3.50	$26,827.50	
7665	SF	irrigation	$1.50	$11,497.50	
					$38,450.00

Between Gutierrez St and Haley St

Est.Quantity	Unit	Description	Unit Cost	Item Cost	Total
0	EA.	24" box trees	$350.00	$0.00	
5	EA.	5 gal trees	$25.00	$125.00	
8	EA.	tree cuttings	$5.00	$40.00	
12479	SF	landscape area	$3.50	$43,676.50	
12479	SF	irrigation	$1.50	$18,718.50	
					$62,560.00

Between Haley St and Cota St

Est.Quantity	Unit	Description	Unit Cost	Item Cost	Total
0	EA.	24" box trees	$350.00	$0.00	
3	EA.	5 gal trees	$25.00	$75.00	
24	EA.	tree cuttings	$5.00	$120.00	
10102	SF	landscape area	$3.50	$35,357.00	
10102	SF	irrigation	$1.50	$15,153.00	
					$50,705.00

Between Cota St and Ortega St

Est.Quantity	Unit	Description	Unit Cost	Item Cost	Total
1	EA.	24" box trees	$350.00	$350.00	
6	EA.	5 gal trees	$25.00	$150.00	
4	EA.	tree cuttings	$5.00	$20.00	
12073	SF	landscape area	$3.50	$42,255.50	
12073	SF	irrigation	$1.50	$18,109.50	
					$60,885.00

Between Ortega St and De La Guerra St

Est.Quantity	Unit	Description	Unit Cost	Item Cost	Total
0	EA.	24" box trees	$350.00	$0.00	
3	EA.	5 gal trees	$25.00	$75.00	
16	EA.	tree cuttings	$5.00	$80.00	
10645	SF	landscape area	$3.50	$37,257.50	
10645	SF	irrigation	$1.50	$15,967.50	
					$53,380.00

LANDSCAPE QUANTITIES

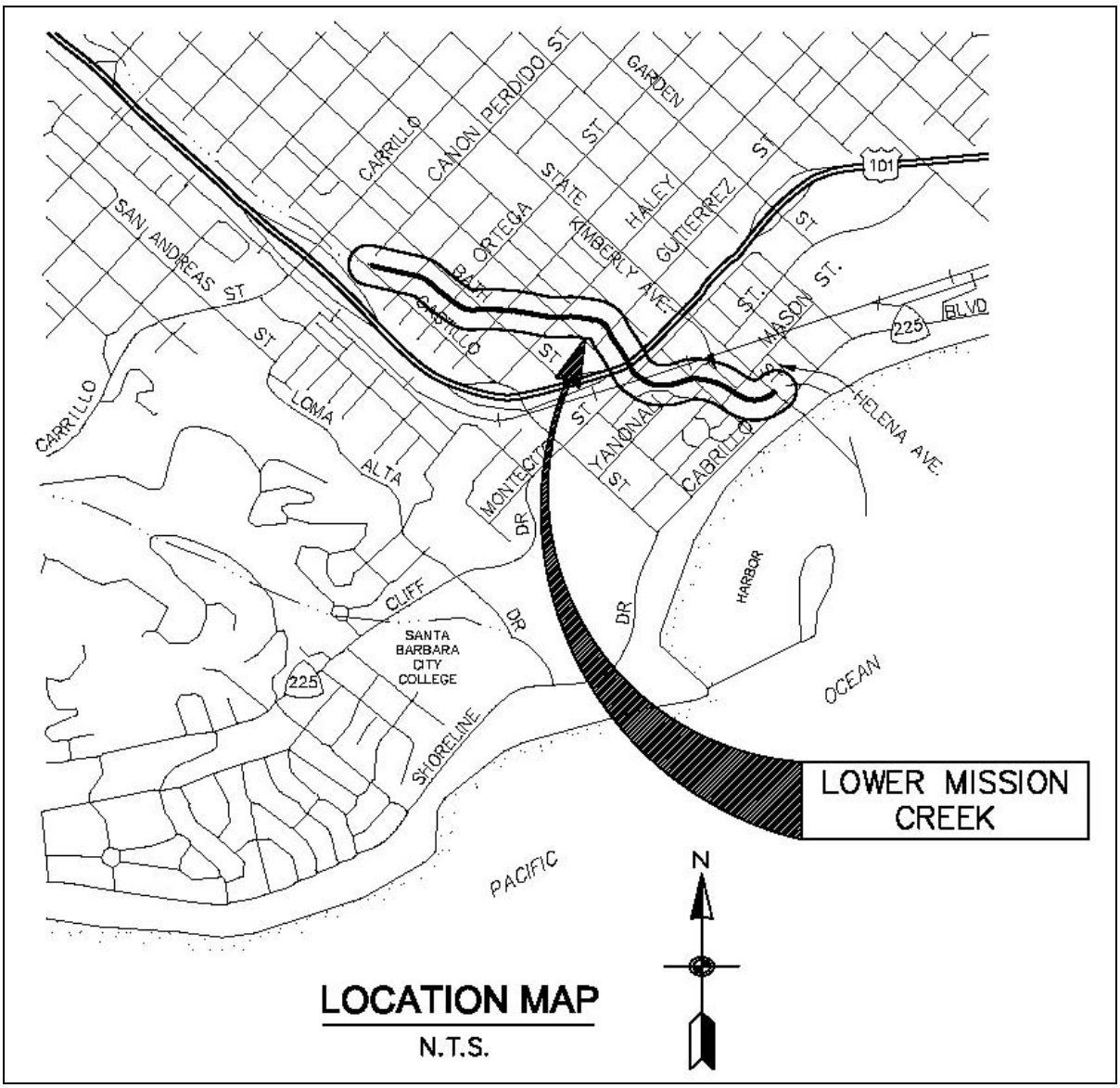
West of De La Guerra St

Est.Quantity	Unit	Description	Unit Cost	Item Cost	Total
2	EA.	24" box trees	$350.00	$700.00	
3	EA.	5 gal trees	$25.00	$75.00	
8	EA.	tree cuttings	$5.00	$40.00	
12705	SF	landscape area	$3.50	$44,467.50	
12705	SF	irrigation	$1.50	$19,057.50	
					$64,340.00

Overall Maintenance of 66920 SF for 1 year @ $0.02/ sf per month	$160,000

APPENDIX A

Site Plan


CANON PERDIDO ST
GARDEN
CARRILLO
ST
STATE
HALEY
GUTIERREZ
ST
101
SAN ANDREAS ST
ORTEGA
KIMBERLY AVE.
BATH
CARRILLO
ST
ST.
MASON ST.
225
BLVD
CARRILLO
ST
LOMA
ALTA
MONTECITO
ST
YANONALI
ST
CABRILLO
HELENA AVE.
DR
CLIFF
DR
DR
HARBOR
SANTA BARBARA CITY COLLEGE
225
OCEAN
SHORELINE
LOWER MISSION CREEK
PACIFIC
N
LOCATION MAP
N.T.S.

APPENDIX C

Tentative Project Schedule

Lower Mission Creek
Tentative Construction Schedule

Mon 10/24/11

ID	Task Name	Duration	Start	Finish	Predecessors
1	**Lower Mission Creek Construction**	**2071 days**	**Mon 3/5/12**	**Thu 10/18/18**	
2	Notice to Proceed	0 days	Mon 3/5/12	Mon 3/5/12	
3	**Reach 1A**	**180 days**	**Mon 3/5/12**	**Sat 9/29/12**	
4	Phase I	180 days	Mon 3/5/12	Sat 9/29/12	2
5	Phase II	180 days	Mon 3/5/12	Sat 9/29/12	2
6	**Reach 1B**	**164 days**	**Mon 3/5/12**	**Tue 9/11/12**	
7	Mobilization	15 days	Mon 3/5/12	Wed 3/21/12	2
8	Demolition	4 days	Thu 3/22/12	Mon 3/26/12	7
9	Excavation	27 days	Tue 3/27/12	Thu 4/26/12	8
10	D-1 Wall	50 days	Fri 4/13/12	Sat 6/9/12	9SS+15 days
11	Filter Material	14 days	Mon 6/11/12	Tue 6/26/12	10
12	Gravel Placement	25 days	Wed 6/27/12	Wed 7/25/12	11
13	Riprap Placement	34 days	Thu 7/26/12	Mon 9/3/12	12
14	Demobilization	7 days	Tue 9/4/12	Tue 9/11/12	13
15	**Reach 2A**	**86 days**	**Mon 3/4/13**	**Tue 6/11/13**	
16	Mobilization	15 days	Mon 3/4/13	Wed 3/20/13	14FS+145 days
17	Excavation / Fill	15 days	Thu 3/21/13	Sat 4/6/13	16
18	Concrete	15 days	Mon 4/8/13	Wed 4/24/13	17
19	Catch Basins	10 days	Thu 4/25/13	Mon 5/6/13	18
20	24" RCP	2 days	Tue 5/7/13	Wed 5/8/13	19
21	Concrete Curb	5 days	Thu 5/9/13	Tue 5/14/13	20
22	AC Pavement	7 days	Wed 5/15/13	Wed 5/22/13	21
23	Landscape	10 days	Thu 5/23/13	Mon 6/3/13	22
24	Demobilization	7 days	Tue 6/4/13	Tue 6/11/13	23
25	**Reach 2B**	**110 days**	**Mon 3/4/13**	**Tue 7/9/13**	
26	Mobilization	15 days	Mon 3/4/13	Wed 3/20/13	14FS+145 days
27	Clearing/Grubbing and Structure Removals	10 days	Thu 3/21/13	Mon 4/1/13	26
28	Excavation and Shoring	35 days	Tue 4/2/13	Sat 5/11/13	27
29	Structural Concrete	30 days	Mon 5/13/13	Sat 6/15/13	28
30	Remove/Replace Access Road	20 days	Mon 6/17/13	Tue 7/9/13	29
31	**Reach 3**	**168 days**	**Mon 3/3/14**	**Sat 9/13/14**	
32	Mobilization	15 days	Mon 3/3/14	Wed 3/19/14	30FS+202 days
33	Demolition	22 days	Thu 3/20/14	Mon 4/14/14	32
34	Excavation	33 days	Tue 4/15/14	Thu 5/22/14	33
35	A-1 Wall	20 days	Fri 5/23/14	Sat 6/14/14	34
36	D-1 Wall	15 days	Mon 6/16/14	Wed 7/2/14	35
37	Filter Material	11 days	Thu 7/3/14	Tue 7/15/14	36
38	Gravel Placement	19 days	Wed 7/16/14	Wed 8/6/14	37
39	Riprap Placement	26 days	Thu 8/7/14	Fri 9/5/14	38
40	Demobilization	7 days	Sat 9/6/14	Sat 9/13/14	39
41	**Reach 4**	**180 days**	**Mon 3/2/15**	**Sat 9/26/15**	
42	Mobilization	15 days	Mon 3/2/15	Wed 3/18/15	40FS+144 days
43	Demolition	16 days	Thu 3/19/15	Mon 4/6/15	42
44	Excavation	34 days	Wed 4/1/15	Sat 5/9/15	43FS-5 days
45	A-1 Wall	9 days	Thu 4/23/15	Sat 5/2/15	44FS-15 days
46	B-1 Wall	20 days	Mon 5/4/15	Tue 5/26/15	45
47	B-2 Wall	16 days	Wed 5/27/15	Sat 6/13/15	46
48	C-1 Wall	9 days	Mon 6/15/15	Wed 6/24/15	47
49	D-1 Wall	40 days	Thu 6/25/15	Mon 8/10/15	48
50	Filter Material	16 days	Fri 7/24/15	Tue 8/11/15	49FS-15 days
51	Gravel Placement	19 days	Thu 8/6/15	Thu 8/27/15	50FS-5 days
52	Riprap Placement	26 days	Thu 8/20/15	Fri 9/18/15	51FS-7 days
53	Demobilization	7 days	Sat 9/19/15	Sat 9/26/15	52
54	**Reach 5**	**187 days**	**Mon 3/7/16**	**Mon 10/10/16**	
55	Mobilization	15 days	Mon 3/7/16	Wed 3/23/16	53FS+138 days
56	Demolition	18 days	Thu 3/24/16	Wed 4/13/16	55
57	Excavation	37 days	Sat 4/2/16	Sat 5/14/16	56FS-10 days
58	B-2 Wall	65 days	Thu 4/21/16	Tue 7/5/16	57FS-21 days
59	C-2 Wall	13 days	Wed 6/29/16	Wed 7/13/16	58FS-6 days
60	D-2 Wall	30 days	Mon 7/11/16	Sat 8/13/16	59FS-3 days
61	Filter Material	17 days	Wed 8/3/16	Mon 8/22/16	60FS-10 days
62	Gravel Placement	21 days	Mon 8/15/16	Wed 9/7/16	61FS-7 days
63	Riprap Placement	28 days	Wed 8/31/16	Sat 10/1/16	62FS-7 days
64	Demobilization	7 days	Mon 10/3/16	Mon 10/10/16	63
65	**Reach 6**	**181 days**	**Mon 3/6/17**	**Mon 10/2/17**	
66	Mobilization	15 days	Mon 3/6/17	Wed 3/22/17	64FS+125 days
67	Demolition	15 days	Thu 3/23/17	Sat 4/8/17	66
68	Excavation	29 days	Mon 4/10/17	Fri 5/12/17	67
69	A-2 Wall	18 days	Tue 5/2/17	Mon 5/22/17	68FS-10 days
70	B-2 Wall	31 days	Tue 5/23/17	Tue 6/27/17	69
71	C-2 Wall	12 days	Wed 6/28/17	Tue 7/11/17	70
72	D-2 Wall	20 days	Wed 7/12/17	Thu 8/3/17	71
73	Filter Material	14 days	Thu 7/27/17	Fri 8/11/17	72FS-7 days
74	Gravel Placement	15 days	Sat 8/12/17	Tue 8/29/17	73
75	Riprap Placement	22 days	Wed 8/30/17	Sat 9/23/17	74
76	Demobilization	7 days	Mon 9/25/17	Mon 10/2/17	75
77	**Reach 7**	**190 days**	**Mon 3/12/18**	**Thu 10/18/18**	
78	Mobilization	15 days	Mon 3/12/18	Wed 3/28/18	76FS+137 days
79	Demolition	7 days	Thu 3/29/18	Thu 4/5/18	78
80	Excavation	47 days	Mon 4/2/18	Fri 5/25/18	79FS-4 days
81	A-2 Wall	8 days	Thu 5/3/18	Fri 5/11/18	80FS-20 days
82	B-2 Wall	25 days	Tue 5/8/18	Tue 6/5/18	81FS-4 days
83	C-2 Wall	40 days	Fri 5/25/18	Tue 7/10/18	82FS-10 days
84	D-2 Wall	52 days	Mon 6/18/18	Thu 8/16/18	83FS-20 days
85	Filter Material	27 days	Tue 7/24/18	Thu 8/23/18	84FS-21 days
86	Gravel Placement	32 days	Wed 8/8/18	Thu 9/13/18	85FS-14 days
87	Riprap Placement	44 days	Tue 8/21/18	Wed 10/10/18	86FS-21 days
88	Demobilization	7 days	Thu 10/11/18	Thu 10/18/18	87

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External MileTask | Split

APPENDIX D

Local Market Labor Rates

General Decision Number: CA100023 06/10/2011 CA23

Superseded General Decision Number: CA20080023

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

County: Santa Barbara County in California.

BUILDING, DREDGING (does not include hopper dredge work), HEAVY (does not include water well drilling), AND HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	03/12/2010
1	03/26/2010
2	04/02/2010
3	04/16/2010
4	06/11/2010
5	07/02/2010
6	07/23/2010
7	08/13/2010
8	08/27/2010
9	09/03/2010
10	09/10/2010
11	12/03/2010
12	01/14/2011
13	02/18/2011
14	03/04/2011
15	04/08/2011
16	04/15/2011
17	04/29/2011
18	05/20/2011
19	05/27/2011
20	06/03/2011
21	06/10/2011

ASBE0005-002 06/28/2010

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems)	$ 32.79	16.31
Fire Stop Technician (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain walls)	$ 24.21	13.76

ASBE0005-004 06/28/2010

	Rates	Fringes
Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)....	$ 18.70	8.65

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* BOIL0092-003 05/01/2011

	Rates	Fringes
BOILERMAKER.....	$ 41.26	25.27

BRCA0004-003 05/01/2011

	Rates	Fringes
Bricklayer; Marble Setter.....	$ 35.85	11.45

BRCA0018-008 06/01/2008

	Rates	Fringes
MARBLE FINISHER.....	$ 25.52	9.08
TILE FINISHER.....	$ 21.07	7.88

BRCA0018-010 09/01/2009

	Rates	Fringes
TERRAZZO FINISHER.....	$ 26.59	9.62
TERRAZZO WORKER/SETTER.....	$ 33.63	10.46

BRCA0018-011 08/01/2009

	Rates	Fringes
TILE LAYER.....	$ 30.04	10.84

CARP0409-001 07/01/2010

	Rates	Fringes
CARPENTER		
(1) Carpenter, Cabinet Installer, Insulation Installer, Hardwood Floor Worker and acoustical installer, and solar panels.	$ 37.35	11.08
(2) Millwright.....	$ 37.85	11.08
(3) Piledriver/Derrick Bargeman, Bridge or Dock Carpenter, Heavy Framer, Rock Bargeman or Scowman,		

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     Rockslinger, Shingler
     (Commercial)................$ 37.48           11.08
     (4) Pneumatic Nailer,
     Power Stapler...............$ 37.60           11.08
     (5)  Sawfiler...............$ 37.44           11.08
     (6)  Scaffold Builder.......$ 28.55           11.08
     (7)  Table Power Saw
     Operator....................$ 37.45           11.08

  FOOTNOTE: Work of forming in the construction of open cut
  sewers or storm drains, on operations in which horizontal
  lagging is used in conjunction with steel H-Beams driven or
  placed in pre- drilled holes, for that portion of a lagged
  trench against which concrete is poured, namely, as a
  substitute for back forms (which work is performed by
  piledrivers): $0.13 per hour additional.  Certified Welder
  - $1.00 per hour premium.
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 CARP0409-002 07/01/2008

                                   Rates          Fringes

Diver
     (1) Wet.....................$ 663.68            9.82
     (2) Standby.................$ 331.84            9.82
     (3) Tender..................$ 323.84            9.82
     (4) Assistant Tender........$ 299.84            9.82

Amounts in "Rates' column are per day
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 CARP0409-005 07/01/2010

                                   Rates          Fringes

Drywall
     DRYWALL INSTALLER/LATHER....$ 37.35           11.08
     STOCKER/SCRAPPER............$ 10.00            6.67
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 CARP0409-008 08/01/2010

                                   Rates          Fringes

Modular Furniture Installer......$ 17.00            7.41
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 ELEC0011-002 11/30/2010

COMMUNICATIONS AND SYSTEMS WORK

                                   Rates          Fringes

Communications System
     Installer...................$ 27.25           10.85
     Technician..................$ 30.23            9.76

SCOPE OF WORK:
  Installation, testing, service and maintenance of systems
  utilizing the transmission and/or transference of voice,
  sound, vision and digital for commercial, educational,
  security and entertainment purposes for the following: TV
  monitoring and surveillance, background-foreground music,
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intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call systems, radio page, school intercom and sound, burglar alarms, fire alarm (see last paragraph below) and low voltage master clock systems in commercial buildings. Communication Systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding all other data systems or multiple systems which include control function or power supply; excluding installation of raceway systems, conduit systems, line voltage work, and energy management systems. Does not cover work performed at China Lake Naval Ordnance Test Station. Fire alarm work shall be performed at the current inside wireman total cost package.

ELEC0413-001 01/01/2011

	Rates	Fringes
Electricians:.....	$ 38.29	3%+16.00

CABLE SPLICERS: $2.00 additional per hour.

ALL WORK AT VANDENBERG AFB: $3.75 additional per hour.

FOOTNOTE: Work from trusses, swinging scaffolds, open ladders, scaffolds, bosun's chairs, stacks, or the maintenance of towers or open platforms where the worker is subject to a direct fall or where the worker has to work from a ladder or other support from a platform within 5 ft. of any direct fall a distance of 50 ft. from the ground floor or supporting structure: double the regular straight-time rate of pay. Safety nets, if used, will not invalidate this.

ELEC1245-001 06/01/2010

	Rates	Fringes
LINE CONSTRUCTION		
(1) Lineman; Cable splicer..	$ 46.14	13.41
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	$ 36.85	12.36
(3) Groundman.....	$ 28.19	12.10
(4) Powderman.....	$ 41.20	12.53

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and day after Thanksgiving, Christmas Day

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ELEV0018-001 01/01/2010

	Rates	Fringes
ELEVATOR MECHANIC	$ 45.33	20.035

FOOTNOTE:
PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.
PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

ENGI0012-003 01/01/2011

	Rates	Fringes
OPERATOR: Power Equipment (All Other Work)		
GROUP 1	$ 36.83	18.72
GROUP 2	$ 37.61	18.72
GROUP 3	$ 37.90	18.72
GROUP 4	$ 39.39	18.72
GROUP 5	$ 40.49	18.72
GROUP 6	$ 39.61	18.72
GROUP 8	$ 39.72	18.72
GROUP 9	$ 40.82	18.72
GROUP 10	$ 39.84	18.72
GROUP 11	$ 40.94	18.72
GROUP 12	$ 40.01	18.72
GROUP 13	$ 40.11	18.72
GROUP 14	$ 40.14	18.72
GROUP 15	$ 40.22	18.72
GROUP 16	$ 40.34	18.72
GROUP 17	$ 40.51	18.72
GROUP 18	$ 40.61	18.72
GROUP 19	$ 40.72	18.72
GROUP 20	$ 40.84	18.72
GROUP 21	$ 41.01	18.72
GROUP 22	$ 41.11	18.72
GROUP 23	$ 41.22	18.72
GROUP 24	$ 41.34	18.72
GROUP 25	$ 41.51	18.72
OPERATOR: Power Equipment (Cranes, Piledriving & Hoisting)		
GROUP 1	$ 38.18	18.72
GROUP 2	$ 38.96	18.72
GROUP 3	$ 39.25	18.72
GROUP 4	$ 39.39	18.72
GROUP 5	$ 39.61	18.72
GROUP 6	$ 39.72	18.72
GROUP 7	$ 39.84	18.72
GROUP 8	$ 40.01	18.72
GROUP 9	$ 40.18	18.72
GROUP 10	$ 41.18	18.72
GROUP 11	$ 42.18	18.72
GROUP 12	$ 43.18	18.72
GROUP 13	$ 44.18	18.72
OPERATOR: Power Equipment (Tunnel Work)		

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GROUP  1....................$ 38.68            18.72
GROUP  2....................$ 39.46            18.72
GROUP  3....................$ 39.75            18.72
GROUP  4....................$ 39.89            18.72
GROUP  5....................$ 40.11            18.72
GROUP  6....................$ 40.22            18.72
GROUP  7....................$ 40.34            18.72
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PREMIUM PAY:

$3.75 per hour shall be paid on all Power Equipment Operator work on the followng Military Bases: China Lake Naval Reserve, Vandenberg AFB, Point Arguello, Seely Naval Base, Fort Irwin, Nebo Annex Marine Base, Marine Corp Logistics Base Yermo, Edwards AFB, 29 Palms Marine Base and Camp Pendleton

Workers required to suit up and work in a hazardous material environment: $2.00 per hour additional. Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

SEE ZONE DEFINITIONS AFTER CLASSIFICATIONS

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine operator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Horizontal Directional Drilling Machine; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter

operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Equipment Greaser (Grease Truck/Multi Shift).

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter(concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any

and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bendng machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity): Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

GROUP 10: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 11: Heavy Duty Repairman - Welder Combination, Welder - Certified.

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth- moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self- loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

GROUP 13: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine,

up to and including 25 yds. struck)

GROUP 14: Canal liner operator; Canal trimmer operator; Remote- control earth-moving equipment operator (operating a second piece of equipment: $1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)

GROUP 15: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in tandem - Quad 9 and similar type)

GROUP 18: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)

GROUP 19: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds.and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 21: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

GROUP 22: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, up to and including 25 yds. struck)

GROUP 23: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)

GROUP 24: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

CRANES, PILEDRIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)

GROUP 2: Truck crane oiler

GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)

GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator

GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)

GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)

GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry

GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)

GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)

GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)

GROUP 2: Power-driven jumbo form setter operator

GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)

GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)

GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor

drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

ENGINEERS ZONES

$1.00 additional per hour for all of IMPERIAL County and the portions of KERN, RIVERSIDE & SAN BERNARDINO Counties as defined below:

That area within the following Boundary: Begin in San Bernardino County, approximately 3 miles NE of the intersection of I-15 and the California State line at that point which is the NW corner of Section 1, T17N,m R14E, San Bernardino Meridian. Continue W in a straight line to that point which is the SW corner of the northwest quarter of Section 6, T27S, R42E, Mt. Diablo Meridian. Continue North to the intersection with the Inyo County Boundary at that point which is the NE corner of the western half of the northern quarter of Section 6, T25S, R42E, MDM. Continue W along the Inyo and San Bernardino County boundary until the intersection with Kern County, as that point which is the SE corner of Section 34, T24S, R40E, MDM. Continue W along the Inyo and Kern County boundary until the intersection with Tulare County, at that point which is the SW corner of the SE quarter of Section 32, T24S, R37E, MDM. Continue W along the Kern and Tulare County boundary, until that point which is the NW corner of T25S, R32E, MDM. Continue S following R32E lines to the NW corner of T31S, R32E, MDM. Continue W to the NW corner of T31S, R31E, MDM. Continue S to the SW corner of T32S, R31E, MDM. Continue W to SW corner of SE quarter of Section 34, T32S, R30E, MDM. Continue S to SW corner of T11N, R17W, SBM. Continue E along south boundary of T11N, SBM to SW corner of T11N, R7W, SBM. Continue S to SW corner of T9N, R7W, SBM. Continue E along south boundary of T9N, SBM to SW corner of T9N, R1E, SBM. Continue S along west boundary of R1E, SMB to Riverside County line at the SW corner of T1S, R1E, SBM. Continue E along south boundary of T1s, SBM (Riverside County Line) to SW corner of T1S, R10E, SBM. Continue S along west boundary of R10E, SBM to Imperial County line at the SW corner of T8S, R10E, SBM. Continue W along Imperial and Riverside county line to NW corner of T9S, R9E, SBM. Continue S along the boundary between Imperial and San Diego Counties, along the west edge of R9E, SBM to the south boundary of Imperial County/California state line. Follow the California state line west to Arizona state line, then north to Nevada state line, then continuing NW back to start at the point which is the NW corner of Section 1, T17N, R14E, SBM

$1.00 additional per hour for portions of SAN LUIS OBISPO, KERN, SANTA BARBARA & VENTURA as defined below:

That area within the following Boundary: Begin approximately 5 miles north of the community of Cholame, on the Monterey County and San Luis Obispo County boundary at the NW corner of T25S, R16E, Mt. Diablo Meridian. Continue south along the west side of R16E to the SW corner of T30S, R16E, MDM. Continue E to SW

corner of T30S, R17E, MDM. Continue S to SW corner of T31S, R17E, MDM. Continue E to SW corner of T31S, R18E, MDM. Continue S along West side of R18E, MDM as it crosses into San Bernardino Meridian numbering area and becomes R30W. Follow the west side of R30W, SBM to the SW corner of T9N, R30W, SBM. Continue E along the south edge of T9N, SBM to the Santa Barbara County and Ventura County boundary at that point whch is the SW corner of Section 34.T9N, R24W, SBM, continue S along the Ventura County line to that point which is the SW corner of the SE quarter of Section 32, T7N, R24W, SBM. Continue E along the south edge of T7N, SBM to the SE corner to T7N, R21W, SBM. Continue N along East side of R21W, SBM to Ventura County and Kern County boundary at the NE corner of T8N, R21W. Continue W along the Ventura County and Kern County boundary to the SE corner of T9N, R21W. Continue North along the East edge of R21W, SBM to the NE corner of T12N, R21W, SBM. Continue West along the north edge of T12N, SBM to the SE corner of T32S, R21E, MDM. [T12N SBM is a think strip between T11N SBM and T32S MDM]. Continue North along the East side of R21E, MDM to the Kings County and Kern County border at the NE corner of T25S, R21E, MDM, continue West along the Kings County and Kern County Boundary until the intersection of San Luis Obispo County. Continue west along the Kings County and San Luis Obispo County boundary until the intersection with Monterey County. Continue West along the Monterey County and San Luis Obispo County boundary to the beginning point at the NW corner of T25S, R16E, MDM.

$2.00 additional per hour for INYO and MONO Counties and the Northern portion of SAN BERNARDINO County as defined below:

That area within the following Boundary: Begin at the intersection of the northern boundary of Mono County and the California state line at the point which is the center of Section 17, T10N, R22E, Mt. Diablo Meridian. Continue S then SE along the entire western boundary of Mono County, until it reaches Inyo County at the point which is the NE corner of the Western half of the NW quarter of Section 2, T8S, R29E, MDM. Continue SSE along the entire western boundary of Inyo County, until the intersection with Kern County at the point which is the SW corner of the SE Â¼ of Section 32, T24S, R37E, MDM. Continue E along the Inyo and Kern County boundary until the intersection with San Bernardino County at that point which is the SE corner of section 34, T24S, R40E, MDM. Continue E along the Inyo and San Bernardino County boundary until the point which is the NE corner of the Western half of the NW quarter of Section 6, T25S, R42E, MDM. Continue S to that point which is the SW corner of the NW quarter of Section 6, T27S, R42E, MDM. Continue E in a straight line to the California and Nevada state border at the point which is the NW corner of Section 1, T17N, R14E, San Bernardino Meridian. Then continue NW along the state line to the starting point, which is the center of Section 18, T10N, R22E, MDM.

REMAINING AREA NOT DEFINED ABOVE RECIEVES BASE RATE

ENGI0012-004 08/01/2009

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                                  Rates          Fringes

OPERATOR:   Power Equipment
(DREDGING)
     (1) Leverman................$ 44.83            17.22
     (2) Dredge dozer............$ 40.36            17.22
     (3) Deckmate................$ 40.25            17.22
     (4) Winch operator (stern
     winch on dredge)............$ 39.70            17.22
     (5) Fireman-Oiler,
     Deckhand, Bargeman,
     Leveehand...................$ 39.16            17.22
     (6) Barge Mate..............$ 39.77            17.22
-----------------------------------------------------------------
 IRON0002-004 07/01/2010

                                  Rates          Fringes

Ironworkers:
     Fence Erector...............$ 26.58            15.26
     Ornamental, Reinforcing
     and Structural..............$ 33.00            23.73

PREMIUM PAY:

$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval
Reserve-Niland,
Edwards AFB, Fort Irwin Military Station, Fort Irwin Training
Center-Goldstone, San Clemente Island, San Nicholas Island,
Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine
Base - Barstow, U.S. Naval Air Facility - Sealey, Vandenberg AFB

$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base,
Naval Post Graduate School - Monterey, Yermo Marine Corps
Logistics Center

$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

-----------------------------------------------------------------
 LABO0300-001 09/01/2010

                                  Rates          Fringes

Brick Tender.....................$ 27.17            12.40
-----------------------------------------------------------------
 LABO0300-003 07/01/2010

                                  Rates          Fringes

LABORER (GUNITE)
     GROUP 1.....................$ 30.04            14.20
     GROUP 2.....................$ 29.09            14.20
     GROUP 3.....................$ 25.55            14.20
LABORER (TUNNEL)
```

GROUP 1	$ 31.24	12.51
GROUP 2	$ 31.56	12.51
GROUP 3	$ 32.02	12.51
GROUP 4	$ 32.71	12.51
LABORER		
GROUP 1	$ 26.33	16.00
GROUP 2	$ 26.88	16.00
GROUP 3	$ 27.43	16.00
GROUP 4	$ 28.98	16.00
GROUP 5	$ 29.33	16.00

FOOTNOTE: GUNITE PREMIUM PAY: Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates. Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis. Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0" above base level and which work must be performed in whole or in part more than 75'-0" above base level, that work performed above the 75'-0" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete screeding for rough strike-off; Concrete, water curing; Demolition laborer, the cleaning of brick if performed by a worker performing any other phase of demolition work, and the cleaning of lumber; Fire watcher, limber, brush loader, piler and debris handler; Flag person; Gas, oil and/or water pipeline laborer; Laborer, asphalt-rubber material loader; Laborer, general or construction; Laborer, general clean-up; Laborer, landscaping; Laborer, jetting; Laborer, temporary water and air lines; Material hose operator (walls, slabs, floors and decks); Plugging, filling of shee bolt holes; Dry packing of concrete; Railroad maintenance, repair track person and road beds; Streetcar and railroad construction track laborers; Rigging and signaling; Scaler; Slip form raiser; Tar and mortar; Tool crib or tool house laborer; Traffic control by any method; Window cleaner; Wire mesh pulling - all concrete pouring operations

GROUP 2: Asphalt shoveler; Cement dumper (on 1 yd. or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute handler, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundation, footings, curbs, gutters and sidewalks; Concrete curer, impervious membrane and form oiler; Cutting torch operator (demolition); Fine grader, highways and street paving, airport, runways and similar type heavy construction; Gas, oil and/or water pipeline wrapper - pot tender and form person; Guinea chaser; Headerboard person - asphalt; Laborer, packing rod steel and pans; Membrane vapor barrier installer; Power broom sweeper (small); Riprap stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Sandblaster

(pot tender); Septic tank digger and installer(lead); Tank scaler and cleaner; Tree climber, faller, chain saw operator, Pittsburgh chipper and similar type brush shredder; Underground laborer, including caisson bellower

GROUP 3: Buggymobile person; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2-1/2 ft. drill steel or longer; Dri-pak-it machine; Gas, oil and/or water pipeline wrapper, 6-in. pipe and over, by any method, inside and out; High scaler (including drilling of same); Hydro seeder and similar type; Impact wrench multi-plate; Kettle person, pot person and workers applying asphalt, lay-kold, creosote, lime caustic and similar type materials ("applying" means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operator of pneumatic, gas, electric tools, vibrating machine, pavement breaker, air blasting, come-alongs, and similar mechanical tools not separately classified herein; Pipelayer's backup person, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rock slinger; Rotary scarifier or multiple head concrete chipping scarifier; Steel headerboard and guideline setter; Tamper, Barko, Wacker and similar type; Trenching machine, hand-propelled

GROUP 4: Asphalt raker, lute person, ironer, asphalt dump person, and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), grinder or sander; Concrete saw person, cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Head rock slinger; Laborer, asphalt- rubber distributor boot person; Laser beam in connection with laborers' work; Oversize concrete vibrator operator, 70 lbs. and over; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit and any other stationary type of tubular device used for the conveying of any substance or element, whether water, sewage, solid gas, air, or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No-joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzle person), water blasting, Porta Shot-Blast

GROUP 5: Blaster powder, all work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller: All power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power; Toxic waste removal

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Batch plant laborer; Bull gang mucker, track person; Changehouse person; Concrete crew, including rodder and spreader; Dump person; Dump person (outside); Swamper

(brake person and switch person on tunnel work); Tunnel materials handling person

GROUP 2: Chucktender, cabletender; Loading and unloading agitator cars; Nipper; Pot tender, using mastic or other materials (for example, but not by way of limitation, shotcrete, etc.); Vibrator person, jack hammer, pneumatic tools (except driller)

GROUP 3: Blaster, driller, powder person; Chemical grout jet person; Cherry picker person; Grout gun person; Grout mixer person; Grout pump person; Jackleg miner; Jumbo person; Kemper and other pneumatic concrete placer operator; Miner, tunnel (hand or machine); Nozzle person; Operating of troweling and/or grouting machines; Powder person (primer house); Primer person; Sandblaster; Shotcrete person; Steel form raiser and setter; Timber person, retimber person, wood or steel; Tunnel Concrete finisher

GROUP 4: Diamond driller; Sandblaster; Shaft and raise work

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Rodmen, Nozzlemen

GROUP 2: Gunmen

GROUP 3: Reboundmen

LABO0300-008 08/05/2009

	Rates	Fringes
LABORER		
PLASTER CLEAN-UP LABORER....	$ 26.65	15.95
PLASTER TENDER.....	$ 29.20	15.95

Work at Military Bases - $3.00 additional per hour:
Coronado Naval Amphibious Base, Fort Irwin, Marine Corps Air Station-29 Palms, Imperial Beach Naval Air Station, Marine Corps Logistics Supply Base, Marine Corps Pickle Meadows, Mountain Warfare Training Center, Naval Air Facility-Seeley, North Island Naval Air Station, Vandenberg AFB.

LABO0882-002 01/01/2010

	Rates	Fringes
Asbestos Removal Laborer.....	$ 26.15	11.65

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos- containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

LABO1184-001 07/01/2010

	Rates	Fringes
Laborers: (HORIZONTAL DIRECTIONAL DRILLING)		
(1) Drilling Crew Laborer	$ 27.05	11.65
(2) Vehicle Operator/Hauler	$ 27.22	11.65
(3) Horizontal Directional Drill Operator	$ 29.07	11.65
(4) Electronic Tracking Locator	$ 31.07	11.65
Laborers: (STRIPING/SLURRY SEAL)		
GROUP 1	$ 28.50	14.56
GROUP 2	$ 29.80	14.56
GROUP 3	$ 31.81	14.56
GROUP 4	$ 33.55	14.56

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender - removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment

GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper

GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

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PAIN0036-002 01/01/2011

	Rates	Fringes
Painters: (Including Lead Abatement)		
(1) Journeyman Painter	$ 27.39	10.08

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     (2) Repaint................$ 23.10            10.08
     (3) Iron & Steel...........$ 29.32            10.08
     (4) High Iron & Steel......$ 31.32            10.08
     (5) All Other Work.........$ 29.32            10.08
```

REPAINT:
Repaint of any structure with the exception of work involving the aerospace industry, breweries, commercial recreational facilities, hotels which operate commercial establishments as part of hotel service, and sports facilities, tenant improvement work not included in conjunction with the construction of the building and all repainting of tenant improvement projects.

HIGH IRON & STEEL:
Aerial towers, towers, radio towers, smoke stacks, flag poles (any flag poles that can be finished from the ground with a ladder excluded), elevated water towers, steeples and domes in their entirety and any other extremely high and hazardous work, cooning steel, bos'n chair, or other similar devices, painting in other high hazardous work shall be classified as high iron & steel

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PAIN0036-008 01/05/2011

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                                  Rates          Fringes

DRYWALL FINISHER/TAPER...........$ 33.22            12.94
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PAIN0036-015 01/01/2011

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                                  Rates          Fringes

GLAZIER..........................$ 36.90            21.78
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FOOTNOTE: Additional $1.25 per hour for work in a condor, from the third (3rd) floor and up Additional $1.25 per hour for work on the outside of the building from a swing stage or any suspended contrivance, from the ground up

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PAIN1247-002 01/01/2010

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                                  Rates          Fringes

SOFT FLOOR LAYER.................$ 30.85            10.54
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PLAS0200-006 08/04/2010

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                                  Rates          Fringes

PLASTERER........................$ 30.21            14.23
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VANDENBURG AFB: $3.00 additional per hour.

PLAS0500-002 07/01/2010

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                                  Rates          Fringes

CEMENT MASON/CONCRETE FINISHER...$ 29.50            19.85
```

PLUM0016-004 07/01/2010

	Rates	Fringes
PLUMBER/PIPEFITTER		
(1) Work on strip malls, light commercial, tenant improvement and remodel work	$ 30.32	14.98
(2) Work on new additions and remodeling of bars, restaurants, stores and commercial buildings not to exceed 5,000 sq. ft. of floor space	$ 37.74	16.66
(3) All other work	$ 38.92	17.64
(4) Vandenburg Air Force Base	$ 43.42	17.64

PLUM0345-001 07/01/2010

	Rates	Fringes
PLUMBER		
Landscape/Irrigation Fitter	$ 27.35	14.59
Sewer & Storm Drain Work	$ 26.43	16.47

ROOF0036-002 08/01/2010

	Rates	Fringes
ROOFER	$ 34.65	9.07

FOOTNOTE: Pitch premium: Work on which employees are exposed to pitch fumes or required to handle pitch, pitch base or pitch impregnated products, or any material containing coal tar pitch, the entire roofing crew shall receive $1.75 per hour "pitch premium" pay.

SFCA0669-007 04/01/2011

	Rates	Fringes
SPRINKLER FITTER	$ 33.35	17.75

SHEE0273-002 02/01/2011

	Rates	Fringes
SHEET METAL WORKER	$ 39.75	16.94

HOLIDAYS: New Year's Day, Martin Luther King Day, President's Day, Good Friday, Memorial Day, Indepdendence Day, Labor Day, Veterans Day,Thankisgiving Day & Friday after, Christmas Day

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TEAM0011-002 07/01/2008

	Rates	Fringes

TRUCK DRIVER

GROUP 1	$ 26.44	18.24
GROUP 2	$ 26.59	18.24
GROUP 3	$ 26.72	18.24
GROUP 4	$ 26.91	18.24
GROUP 5	$ 26.94	18.24
GROUP 6	$ 26.97	18.24
GROUP 7	$ 27.22	18.24
GROUP 8	$ 27.47	18.24
GROUP 9	$ 27.67	18.24
GROUP 10	$ 27.97	18.24
GROUP 11	$ 28.47	18.24
GROUP 12	$ 28.90	18.24

WORK ON ALL MILITARY BASES:
PREMIUM PAY: $3.00 per hour additional.
[29 palms Marine Base, Camp Roberts, China Lake, Edwards AFB, El Centro Naval Facility, Fort Irwin, Marine Corps Logistics Base at Nebo & Yermo, Mountain Warfare Training Center, Bridgeport, Point Arguello, Point Conception, Vandenberg AFB]

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Truck driver

GROUP 2: Driver of vehicle or combination of vehicles - 2 axles; Traffic control pilot car excluding moving heavy equipment permit load; Truck mounted broom

GROUP 3: Driver of vehicle or combination of vehicles - 3 axles; Boot person; Cement mason distribution truck; Fuel truck driver; Water truck - 2 axle; Dump truck, less than 16 yds. water level; Erosion control driver

GROUP 4: Driver of transit mix truck, under 3 yds.; Dumpcrete truck, less than 6-1/2 yds. water level

GROUP 5: Water truck, 3 or more axles; Truck greaser and tire person ($0.50 additional for tire person); Pipeline and utility working truck driver, including winch truck and plastic fusion, limited to pipeline and utility work; Slurry truck driver

GROUP 6: Transit mix truck, 3 yds. or more; Dumpcrete truck, 6-1/2 yds. water level and over; Vehicle or combination of vehicles - 4 or more axles; Oil spreader truck; Dump truck, 16 yds. to 25 yds. water level

GROUP 7: A Frame, Swedish crane or similar; Forklift driver; Ross carrier driver

GROUP 8: Dump truck, 25 yds. to 49 yds. water level; Truck repair person; Water pull - single engine; Welder

GROUP 9: Truck repair person/welder; Low bed driver, 9 axles or over

GROUP 10: Dump truck - 50 yds. or more water level; Water pull - single engine with attachment

GROUP 11: Water pull - twin engine; Water pull - twin engine with attachments; Winch truck driver - $1.25 additional when operating winch or similar special attachments

GROUP 12: Boom Truck 17K and above

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an

interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

APPENDIX E

Estimated Production Rates

TITLE:	Lower Mission Creek		
SUBJECT:	Output Rates Steel Sheet Piles		
MADE BY:	SKV	JOB NO.:	T24732
CHECKED BY:		DATE:	2/17/2011

Sheet No. 1 of 1

PZ 27 STEEL SHEET PILE

CREW:	Z Steel Set Pile Crew (Land)	8 crew members
PRODUCTION	0.12 mh/vlf	
Output	8.00 mh/crew hr / 0.12 mh/vlf	70 vlf/crew hr

PZ 27 STEEL SHEET PILE DEMOLITION

CREW:	Z Steel Set Pile Crew (Land)	5 crew members
PRODUCTION	1.00 mh/ea	
Output	5.00 mh/crew hr / 1.00 mh/ea	5 ea/crew hr

TITLE:	Lower Mission Creek		
SUBJECT:	Output Rates for Rock Placement		
MADE BY:	SKV	JOB NO.:	T24732
CHECKED BY:		DATE:	2/17/2011

Sheet No. 1 of 1

RIPRAP

CREW:	Z Riprap Placement Crew		2	crew members
PRODUCTION				
	5	cy bucket		
	0.60	% fill		
	45	min/hr		
	0.50	cycle/min		
	1.50	ton/cy		
Output	101	ton/ crew hr	101	ton/crew hr

GRAVEL

CREW:	Z Gravel Placement Crew		4	crew members
PRODUCTION				
	5	cy bucket		
	0.80	% fill		
	45	min/hr		
	0.50	cycle/min		
	1.50	ton/cy		
Output	135	ton/ crew hr	135	ton/crew hr

BOULDER CLUSTER

CREW:	Z Boulder Cluster Crew		4	crew members
PRODUCTION	0.08	mh/ton		
Output	1.00	mh/crew hr	13	ton/crew hr
	0.080	mh/ton		

TITLE:	Lower Mission Creek		
SUBJECT:	Output Rates Geotextile Fabric		
MADE BY:	SKV	JOB NO.:	T24732
CHECKED BY:		DATE:	2/17/2011

Sheet No. 1 of 1

GEOTEXTILE PLACEMENT

CREW: Z Geotextile Placement Crew — 2 crew members

PRODUCTION 0.02 mh/sy

Output $\frac{2.00 \text{ mh/crew hr}}{0.02 \text{ mh/sy}}$ → 114 sy/crew hr

DRAINAGE MAT PLACEMENT

CREW: Z Drainage Mat Placement Crew — 2 crew members

PRODUCTION 0.01 mh/sf

Output $\frac{2.00 \text{ mh/crew hr}}{0.01 \text{ mh/sf}}$ → 200 sf/crew hr

TITLE:	Lower Mission Creek		
SUBJECT:	Output Rates for Bulkhead Placement		
MADE BY:	SKV	JOB NO.:	T24732
CHECKED BY:		DATE:	2/17/2011

Sheet No. 1 of 1

BULKHEAD PLACEMENT

CREW:	Z Crane Crew	4 crew members
PRODUCTION	27.50 mh/ea	
Output	4.00 mh/crew hr / 27.50 mh/ea	0.15 ea/crew hr

TITLE:	Lower Mission Creek		
SUBJECT:	Output Rates for Structural Steel Placement		
MADE BY:	SKV	JOB NO.:	T24732
CHECKED BY:		DATE:	2/17/2011

Sheet No. 1 of 1

STRUCTURAL STEEL PLACEMENT

CREW:	Z Steel Placement Crew	4 crew members
PRODUCTION	40.00 mh/ton	
Output	$\frac{4.00 \text{ mh/crew hr}}{40.00 \text{ mh/ton}}$	0.10 ton/crew hr

APPENDIX F

Phone Logs and Emails

TETRA TECH, INC.

PHONE LOG

CLIENT:	Los Angeles District, U.S. Army Corps of Engineers
JOB TITLE:	Lower Mission Creek Flood Control
PROJECT NO.:	T24732
SUBJECT:	Fitzgerald Formliners
CONVERSATION DATE:	February 11, 2011
PREPARED BY:	Scott Vose
CONVERSATIONALISTS:	Josh Hernandez of Fitzgerald Formliners and Scott Vose of Tetra Tech

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This phone log summarizes the items discussed or issues resolved during the phone conversation to the best of the writer's ability.

Josh Hernandez from Fitzgerald Formliners was spoken to. The Fitzgerald Formliners office is located in Santa Ana, CA. Josh's phone number is (714) 612-3333. Fitzgerald Formliners is capable of providing materials for the concrete formliners that would be used on portions of the floodwall to provide a stone looking finish. Josh gave the following price quotes and information regarding the purchase of the formliners:

- For the specific formliner requested, there are two types of materials that they could be made out of. The formliner made of urethane could be reused up to 100 times but is more expensive. Whereas the liner made of "ABS .150" can be reused up to 15 times, but is cheaper. Josh provided quotes on both.

- Josh based his quotes on needing approximately 3,000-lf of channel with walls on both sides in order to calculate a price per square foot. We also assumed an average height of 15-ft for the channel walls.

- The quotes for the two formliner materials are on the next pages.

- The urethane formliner would require 1,504-sf of forms to be purchased to cover the 3,000-lf of channel in the estimate. The purchasing of the 1,504-sf of urethane liners would cost $36,833.20. This cost would be spread over the total area of the walls (3000-lf x 2-sides x 15-ft height = 90,000-sf). So the unit cost of this liner would be approximately $0.41-sf of wall.

- The plastic formliner would require 6,016-sf of forms to be purchased to cover the 3,000-lf of channel in the estimate. The purchasing of the 6,016-sf of urethane liners would cost

$22,320.77. This cost would be spread over the total area of the walls (3000-lf x 2-sides x 15-ft height = 90,000-sf). So the unit cost of this liner would be approximately $0.25-sf of wall.

Fitzgerald Formliners

www.formliners.com

1500 E. Chestnut, Santa Ana, CA 92701 Phone: 714-547-6710, Fax: 714-547-7958

Price Quotation

Cover Sheet

138067SA0211

1022101609 1570523203

Scott Vose
Tetra Tech, Inc.
17885 Von Karman Suite 500

Irvine, California
92614

Date: February/11/2011
Time: 10:49 AM
Phone: 949-809-5115
Fax: 949-809-5013
Project: Lower Mission Creek

Congratulations for choosing Fitzgerald Formliners and Thank you for the opportunity to quote the liner on your project!

We have been manufacturing form liner exclusively since 1979 and we are a leader in the industry in both manufacturing and quality of liner. We offer local on-site sales support for your project as well as a qualified in- house sales staff. We welcome you to tour our facility and experience first- hand why we lead the industry in liner.

Freight rate is approximate to your zip code, based on a single shipment. Due to recent volatility in fuel prices all shipping costs are subject to upward revision at time of shipment.

Lead-time begins upon receipt of a written purchase order, signed sales order acknowledgement, deposit and any required approvals.

Note: This proposal is based upon information made available to us at bid time and is a minimum quantity order. If less material is ordered the overall total price will remain the same; if more material is ordered the overall total

price will increase.

DEPOSITS
A deposit of 100% is required unless an open terms credit account has been set up with Fitzgerald Formliners, in which case, deposits will be modified according to credit history and background.

CUSTOM ORDER DEPOSIT
A 50% deposit is required on all custom patterns.

FORM RELEASE AGENT
The application of a form release agent is critical to the performance of the formliner. Refer to the application guide for this product.

GRAYLASTIC
This pattern is manufactured in extended use elastomeric urethane, is factory mold bonded to ¾" plywood and is edge sealed on four sides (approximately .5")

EXPANSION AND CONTRACTION
Thermal Expansion and Contraction occurs as ambient temperatures change during the day. This is normal with all thermal formed form liners. For additional information please refer to application guidelines for installation instructions.

WOOD BACKING
This pattern is manufactured in plastic and may require wood backing to prevent deflection from concrete pressure.

Thank You,

Josh Hernandez

Fitzgerald Formliners

www.formliners.com

1500 E. Chestnut, Santa Ana, CA 92701 Phone: 714-547-6710, Fax: 714-547-7958

Price Quotation

California/ Nevada- Outside Sales

M: 714.612.3333
jhernandez@formliners.com

Fitzgerald Formliners

www.formliners.com

1500 E. Chestnut, Santa Ana, CA 92701 Phone: 714-547-6710, Fax: 714-547-7958

Price Quotation

Lower Mission Creek **138067SA0211**

1022101609 1570523203

Scott Vose
Tetra Tech, Inc.
17885 Von Karman Suite 500

Irvine, California
92614

Date: February/11/2011
Time: 1:14 PM
Phone: 949-809-5115
Fax: 949-809-5013

Product:	GrayLastic	
Material:	Urethane	
Quantity/Unit Price:	1504 /	$22.00
Tooling Cost:		
Setup Fee:		$0.00
Extended Price:		$33,088.00
Shipping Terms:		FOB Santa Ana
Estimated Freight:		$850.00
Weight:		11028
Tax:		$2,895.20
DepositPercent		
Estimated Delivery		6 weeks
Total		$36,833.20

All freight rates are approximate

17004

17004

Details PATTERN 17004 (shallow) Liberty Island Stone 1.625" Depth, Random Cut Stone, Heavy Texture Face. 1,504 SF quoted (47) 48" x 96" panels needed. GrayLastic Elastomeric Urethane- up to 100 uses.

FITZGERALD FORMLINERS™ Vac-U-Form™ GrayLastic™ Vinylok® Fiberlyte™

CHECK OUR ONLINE CATALOG AT
www.formliners.com

Fitzgerald Formliners

www.formliners.com

1500 E. Chestnut, Santa Ana, CA 92701 Phone: 714-547-6710, Fax: 714-547-7958

Price Quotation

Product:	Vac-U-Form	17004
Material:	ABS .150	
Quantity/Unit Price:	6016 / $3.32	
Tooling Cost:		
Setup Fee:	$0.00	
Extended Price:	$19,973.12	
Shipping Terms:	FOB Santa Ana	
Estimated Freight:	$600.00	
Weight:	5500	
Tax:	$1,747.65	
DepositPercent		
Estimated Delivery	4 weeks	
Total	$22,320.77	

17004

All freight rates are approximate

Details PATTERN 17004 (shallow) Liberty Island Stone 1.625" Depth, Random Cut Stone, Heavy Texture Face. 6,016 SF quoted (188) 48" x 96" sheets needed. VAC-U-FORM ABS Plastic .150- up to 15 reuses.

Comments: I thank you again for the opportunity to provide a solution and quote the Form Liner on your project. I am your local Fitzgerald Form Liner Representative. I am available for onsite assistance as well as technical advice regarding forming/ form liner. It has been my pleasure assisting you in the bidding process. I look forward to working with you.

Thank you.

Josh Hernandez
California/ Nevada- Outside Sales
M: 714.612.3333
jhernandez@formliners.com

Josh Hernandez

FITZGERALD FORMLINERS™ Vac-U-Form™ GrayLastic™ Vinylok® Fiberlyte™

CHECK OUR ONLINE CATALOG AT www.formliners.com

TETRA TECH, INC.

PHONE LOG

CLIENT:	Los Angeles District, U.S. Army Corps of Engineers
JOB TITLE:	Lower Mission Creek Flood Control
PROJECT NO.:	T24732
SUBJECT:	Rock Prices
CONVERSATION DATE:	February 22, 2011
PREPARED BY:	Scott Vose
CONVERSATIONALISTS:	Kirk from Bee Rock Quarry and Scott Vose of Tetra Tech

---

This phone log summarizes the items discussed or issues resolved during the phone conversation to the best of the writer's ability.

Kirk from Bee Rock Quarry was spoken to. The Bee Rock Quarry is located in Santa Ynez, CA. Kirk's phone number is (805) 688-9869. Bee Rock Quarry is capable of providing materials for the rip rap, gravel, and boulders that are required in this project. Kirk gave the following price quotes and information regarding the purchase of the steel material:

- The 18" riprap is currently going for $30.00-ton stockpiled at the quarry.
- The cost of delivery for riprap to the project site would run between $8 - $9 per ton.
- For gravel stockpiled at the quarry, the going rate is $12.00-ton.
- For delivery of gravel, the same rate as the riprap delivery may be applied.
- 4-ft boulders would cost $30.00-ton stockpiled at the quarry. Delivery of these boulders to the project site would run around $13.00-ton.

TETRA TECH, INC.

PHONE LOG

CLIENT:	Los Angeles District, U.S. Army Corps of Engineers
JOB TITLE:	Lower Mission Creek Flood Control
PROJECT NO.:	T24732
SUBJECT:	Filter Material
CONVERSATION DATE:	February 22, 2011
PREPARED BY:	Scott Vose
CONVERSATIONALISTS:	Tom from US Filters and Scott Vose of Tetra Tech

---

This phone log summarizes the items discussed or issues resolved during the phone conversation to the best of the writer's ability.

Tom from US Filters was spoken to. US Filters is capable of providing materials for the geotextile fabric and drainage mat materials that are required in this project. Tom gave the following price quotes and information regarding the purchase of the steel material:

- The recommended geotextile fabric for this project would cost $0.60 per square yard. The delivery would cost $3,000.00 per truck and a truck could hold 150 rolls. Each roll is made up of 500 square yards.

- The cost for a material that could be used as the drainage mat was provided at $150 per roll. The quantity per roll was given as 250 square feet.

TETRA TECH, INC.

PHONE LOG

CLIENT:	Los Angeles District, U.S. Army Corps of Engineers
JOB TITLE:	Lower Mission Creek Flood Control
PROJECT NO.:	T24732
SUBJECT:	I Beams for Soldier Piles
CONVERSATION DATE:	February 11, 2011
PREPARED BY:	Scott Vose
CONVERSATIONALISTS:	Fred from Metal Supply Inc. and Scott Vose of Tetra Tech

---

This phone log summarizes the items discussed or issues resolved during the phone conversation to the best of the writer's ability.

Fred from Metal Supply Inc. was spoken to. The Metal Supply Inc. office is located in Long Beach, CA. Fred's phone number is (800) 400-6382. Metal Supply Inc. is capable of providing materials for the steel I-beams that would be used on portions of the floodwall for the soldier pile foundation. Fred gave the following price quotes and information regarding the purchase of the steel material:

- The going rate for steel I-beams is $0.85-lb.
- An estimated delivery rate for the steel products is approximately $0.10-lb.

Vose, Scott

From: Torreyson, Aric
Sent: Monday, March 07, 2011 4:04 PM
To: Vose, Scott
Subject: Fwd: TCPS for LMC (UNCLASSIFIED)

Fyi

Sincerely,

ARIC TORREYSON, P.E.
|
Surface Water Group
Tetra Tech Complex World, Clear Solutions
Aric.Torreyson@tetratech.com Cell:
951.662.0788
Phone 213.327.0800 x106

----- Forwarded message -----
From: "Tran, Tawny" <Tawny.T.Tran@usace.army.mil>
Date: Mon, Mar 7, 2011 3:58 pm
Subject: TCPS for LMC (UNCLASSIFIED)
To: "Torreyson, Aric" <Aric.Torreyson@tetratech.com>
Cc: "Tizon, Margie A SPL" <Margie.A.Tizon@usace.army.mil>, "Blackburn, Sheryl A SPL" <Sheryl.A.Blackburn@usace.army.mil>, "Tran, Tawny" <Tawny.T.Tran@usace.army.mil>

Classification: UNCLASSIFIED

Caveats: NONE

Aric,

The following costs are what we discussed for TCPS on 3/8/11:

- Sunk costs: 2,541,877.86
- Total Allocation to date: 2,744,000
- Balance to Complete: 1,100,000

Hope this is what you need for to calculate TCPS.

Sincerely,

Tawny Tran, PMP
Project Manager
U.S. Army Corps of Engineers,
Los Angeles District/Civil Works Branch
915 Wilshire Blvd, Los Angeles, CA 90017-3401
Ph: 213-452-3319 Cell:213-359-6473
Tawny.T.Tran@usace.army.mil

Classification: UNCLASSIFIED

Caveats: NONE

Lariviere, Damien A SPL

From: Tran, Tawny
Sent: Monday, March 29, 2010 8:04 AM
To: Lariviere, Damien A SPL
Subject: FW: LMC reaches

Follow Up Flag: Follow up
Flag Status: Green

Tawny Tran, PMP
Project Manager
U.S. Army Corps of Engineers,
Los Angeles District/Civil Works Branch
915 Wilhire Blvd, Los Angeles, CA 90017-3401
Ph: 213-452-3319 Cell:213-359-6473
Tawny.T.Tran@usace.army.mil

-----Original Message-----
From: Tromp, Joyce [mailto:Jtromp@cosbpw.net]
Sent: Friday, March 26, 2010 9:23 AM
To: Frye, Jon; Tran, Tawny
Subject: RE: LMC reaches

HDR . across RR TRACTS

Hi Tawny,
For the UPRR box culvert, Flood Control paid $1,502,020.59. Please let me know if you need any more information.
Thanks.
Joyce

DATE

-----Original Message-----
From: Frye, Jon
Sent: Thursday, March 25, 2010 6:29 PM
To: 'Tran, Tawny '; Tromp, Joyce
Subject: RE: LMC reaches

Joyce,
Please provide Tawny the HDR construction cost estimate for Reach 2 (from the UPRR tracks upstream to just above US 101). Also please send the construction costs (actual) from the installation of the UPRR box culverts.
Thanks
Jon

-----Original Message-----
From: Tran, Tawny [mailto:Tawny.T.Tran@usace.army.mil]
Sent: Thursday, March 25, 2010 2:34 PM
To: Frye, Jon
Subject: RE: LMC reaches

Jon,Thanks so much for your time and help on this complicated project.

Tawny Tran, PMP
Project Manager
U.S. Army Corps of Engineers,
Los Angeles District/Civil Works Branch
915 Wilhire Blvd, Los Angeles, CA 90017-3401
Ph: 213-452-3319 Cell:213-359-6473
Tawny.T.Tran@usace.army.mil

-----Original Message-----
From: Frye, Jon [mailto:Jfrye@cosbpw.net]
Sent: Thursday, March 25, 2010 11:23 AM
To: Tran, Tawny
Subject: FW: LMC reaches

Here you go, Tawny.

Thanks for stopping by the Flood Control office today,

Jon

From: Tromp, Joyce
Sent: Thursday, March 25, 2010 10:49 AM
To: Frye, Jon
Cc: Griffin, Matthew
Subject: LMC reaches

Here is a pdf showing the reaches as well as the existing open channel.

APPENDIX G

MCACES Construction Cost Estimates

LOWER MISSION CREEK FLOOD CONTROL

Estimated by	Tetra Tech, Inc.
Designed by	Tetra Tech, Inc.
Prepared by	Tetra Tech, Inc
Preparation Date	10/22/2011
Effective Date of Pricing	8/29/2011
Estimated Construction Time	2,416 Days

This report is not copyrighted, but the information contained herein is For Official Use Only.

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
Project Cost Summary Report			**36,392,199**	**36,392,199**	
			36,392,198.86	*36,392,198.86*	
09 Channels	**1.00**	**EA**	**36,392,199**	**36,392,199**	
1B Reach 1B	**1.00**	**LS**	**4,515,244**	**4,515,244**	
1B 00 Mobilization / Demobilization	**1.00**	**LS**	**105,582**	**105,582**	
			71,384.16	*71,384.16*	
1B 00 01 Mobilization	**1.00**	**EA**	**71,384**	**71,384**	
			34,197.44	*34,197.44*	
1B 00 02 Demobilization	**1.00**	**EA**	**34,197**	**34,197**	
1B 01 Demolition	**1.00**	**LS**	**39,744**	**39,744**	
			25.64	*25.64*	
1B 01 01 Demo Gabion	**264.00**	**SF**	**6,768**	**6,768**	
			14.63	*14.63*	
1B 01 04 Demo Concrete Slope	**441.00**	**SF**	**6,452**	**6,452**	
			13.87	*13.87*	
1B 01 05 Demo Concrete Bags	**1,194.00**	**SF**	**16,559**	**16,559**	
			163.50	*163.50*	
1B 01 06 Demo Existing Storm Drain	**40.00**	**LF**	**6,540**	**6,540**	
			3,425.85	*3,425.85*	
1B 01 07 Remove / Replace Light Pole	**1.00**	**EA**	**3,426**	**3,426**	
			580.02	*580.02*	
1B 01 07 01 Remove Light Pole	**1.00**	**EA**	**580**	**580**	
			2,845.83	*2,845.83*	
1B 01 07 02 Replace Light Pole	**1.00**	**EA**	**2,846**	**2,846**	
1B 02 Channel Grading	**1.00**	**LS**	**317,623**	**317,623**	
			22,569.17	*22,569.17*	
1B 02 00 Clearing and Grubbing	**0.66**	**ACR**	**14,896**	**14,896**	
			41.08	*41.08*	
1B 02 01 Excavate (Wall to Wall)	**6,675.00**	**CY**	**274,241**	**274,241**	
			33.87	*33.87*	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
1B 02 02 Excavate for Riprap Placement	**782.00**	**CY**	**26,485**	**26,485**	
			32.28	*32.28*	
1B 02 04 Fill	**62.00**	**CY**	**2,001**	**2,001**	
1B 03 Channel Wall	**1.00**	**LS**	**2,720,374**	**2,720,374**	
			3,417.56	*3,417.56*	
1B 03 01 Wall Type D-1	**796.00**	**LF**	**2,720,374**	**2,720,374**	
			17,970.75	*17,970.75*	
1B 03 01 01 Soldier Piles	**81.00**	**EA**	**1,455,631**	**1,455,631**	
			4,304.52	*4,304.52*	
1B 03 01 02 Timber Lagging	**78.00**	**MBF**	**335,752**	**335,752**	
			597.84	*597.84*	
1B 03 01 03 Concrete	**1,032.00**	**CY**	**616,970**	**616,970**	
			3,227.05	*3,227.05*	
1B 03 01 04 Reinforcing Steel	**77.40**	**TON**	**249,774**	**249,774**	
			1.76	*1.76*	
1B 03 01 05 Drainage Mat	**11,144.00**	**SF**	**19,663**	**19,663**	
			88.06	*88.06*	
1B 03 01 06 Weep Holes	**81.00**	**EA**	**7,133**	**7,133**	
			44.54	*44.54*	
1B 03 01 07 Underdrain Pipe	**796.00**	**LF**	**35,451**	**35,451**	
1B 04 Fill Material	**1.00**	**LS**	**80,616**	**80,616**	
			76.21	*76.21*	
1B 04 01 Riprap	**818.00**	**TON**	**62,342**	**62,342**	
			76.21	*76.21*	
1B 04 01 01 Toe Revetment Riprap	**818.00**	**TON**	**62,342**	**62,342**	
			43.27	*43.27*	
1B 04 02 Gravel	**355.00**	**TON**	**15,362**	**15,362**	
			43.27	*43.27*	
1B 04 02 01 Toe Revetment Gravel	**355.00**	**TON**	**15,362**	**15,362**	
			3.34	*3.34*	
1B 04 03 Filter Material	**873.00**	**SY**	**2,913**	**2,913**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			3.34	*3.34*	
1B 04 03 01 Toe Revetment Geotextile	**873.00**	**SY**	**2,913**	**2,913**	
			3,580.37	*3,580.37*	
1B 05 Boulder Cluster	**2.00**	**EA**	**7,161**	**7,161**	
1B 07 Fencing	**1.00**	**LS**	**41,171**	**41,171**	
			57.50	*57.50*	
1B 07 01 Safety Fence	**716.00**	**LF**	**41,171**	**41,171**	
			11,803.77	*11,803.77*	
1B 09 Landscaping	**1.00**	**EA**	**11,804**	**11,804**	
			45.86	*45.86*	
1B 10 Fish Ledge	**110.00**	**LF**	**5,045**	**5,045**	
			20.17	*20.17*	
1B 11 Reinforced Gutter	**796.00**	**LF**	**16,057**	**16,057**	
			356.55	*356.55*	
1B 12 Construct 54" RCP	**40.00**	**LF**	**14,262**	**14,262**	
1B 13 Water Control / Dewatering	**1.00**	**LS**	**1,155,804**	**1,155,804**	
			44.84	*44.84*	
1B 13 01 Cofferdam (Sheetpile PZ-27 40' Long)	**5,000.00**	**SF**	**224,179**	**224,179**	
			22.03	*22.03*	
1B 13 02 Cofferdam Enclosure End Sections	**255.00**	**SF**	**5,618**	**5,618**	
			92,600.72	*92,600.72*	
1B 13 03 Wells	**10.00**	**EA**	**926,007**	**926,007**	
2A Reach 2A	**1.00**	**LS**	**1,362,785**	**1,362,785**	
2A 00 Mobilization / Demobilization	**1.00**	**LS**	**96,905**	**96,905**	
			65,673.54	*65,673.54*	
2A 00 01 Mobilization	**1.00**	**EA**	**65,674**	**65,674**	
			31,231.27	*31,231.27*	
2A 00 02 Demobilization	**1.00**	**EA**	**31,231**	**31,231**	
			28.87	*28.87*	
2A 01 Excavation	**4,948.00**	**CY**	**142,868**	**142,868**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			17.86	*17.86*	
2A 02 Fill	**1,886.00**	**CY**	**33,685**	**33,685**	
			69.73	*69.73*	
2A 03 Rock Base	**451.00**	**CY**	**31,447**	**31,447**	
			665.95	*665.95*	
2A 04 Concrete	**1,090.00**	**CY**	**725,883**	**725,883**	
			3,283.12	*3,283.12*	
2A 05 Reinforcing Steel	**81.80**	**TON**	**268,560**	**268,560**	
			16.06	*16.06*	
2A 06 Landscaping	**1,600.00**	**SF**	**25,701**	**25,701**	
			4,613.52	*4,613.52*	
2A 07 Catch Basin	**2.00**	**EA**	**9,227**	**9,227**	
			45.60	*45.60*	
2A 07 01 Excavation	**13.33**	**CY**	**608**	**608**	
			431.85	*431.85*	
2A 07 02 Footing	**10.00**	**CY**	**4,319**	**4,319**	
			2,049.67	*2,049.67*	
2A 07 03 Catch Basin	**2.00**	**EA**	**4,099**	**4,099**	
			60.38	*60.38*	
2A 07 04 Backfill	**3.33**	**CY**	**201**	**201**	
			177.85	*177.85*	
2A 08 24" RCP	**100.00**	**LF**	**17,785**	**17,785**	
			48.30	*48.30*	
2A 09 Curb	**100.00**	**LF**	**4,830**	**4,830**	
			8.84	*8.84*	
2A 09 01 Demo Curb	**100.00**	**LF**	**884**	**884**	
			39.46	*39.46*	
2A 09 02 Replace Curb	**100.00**	**LF**	**3,946**	**3,946**	
			23.58	*23.58*	
2A 10 AC Pavement	**250.00**	**SF**	**5,894**	**5,894**	
			45.18	*45.18*	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
2A 10 01 Remove AC Pavement	**28.00**	**SY**	**1,265**	**1,265**	
			165.33	*165.33*	
2A 10 02 Replace AC Pavement	**28.00**	**SY**	**4,629**	**4,629**	
2B Reach 2B	**1.00**	**LS**	**3,834,822**	**3,834,822**	
2B 01 Mobilization / Demob	**1.00**	**LS**	**119,466**	**119,466**	
			86,905.02	*86,905.02*	
2B 01 01 Mobilization	**1.00**	**EA**	**86,905**	**86,905**	
			32,561.10	*32,561.10*	
2B 01 01 Demobilization	**1.00**	**EA**	**32,561**	**32,561**	
2B 02 Storm Water Pollution Prevention Plan	**1.00**	**LS**	**11,497**	**11,497**	
2B 03 Water Pollution Control	**1.00**	**LS**	**21,557**	**21,557**	
2B 04 Construction Area Signs	**1.00**	**LS**	**2,418**	**2,418**	
2B 05 Traffic Control	**1.00**	**LS**	**14,371**	**14,371**	
			16.07	*16.07*	
2B 06 Shoring of Excavation	**10,000.00**	**SF**	**160,695**	**160,695**	
			23,582.76	*23,582.76*	
2B 07 Clearing and Grubbing	**1.00**	**ACR**	**23,583**	**23,583**	
			36.19	*36.19*	
2B 08 Additional Subgrade Overexcavation	**100.00**	**CY**	**3,619**	**3,619**	
2B 09 Structure Removals Per Plan	**1.00**	**LS**	**12,934**	**12,934**	
			27.49	*27.49*	
2B 10 Unclassified Excavation	**14,800.00**	**CY**	**406,817**	**406,817**	
			562.81	*562.81*	
2B 11 Structural Concrete	**2,073.00**	**CY**	**1,166,711**	**1,166,711**	
			3.63	*3.63*	
2B 12 Structural Steel	**357,954.00**	**LB**	**1,299,467**	**1,299,467**	
			44.40	*44.40*	
2B 13 12" PVC Storm Drain SDR 35	**77.00**	**LF**	**3,419**	**3,419**	
			42.93	*42.93*	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
2B 14 15" PVC Storm Drain SDR 35	**102.00**	**LF**	**4,379**	**4,379**	
2B 15 18" RCP Storm Drain (D-load Per Plan)	**50.00**	**LF**	*116.45* **5,823**	*116.45* **5,823**	
2B 16 12" PVC Elbow SDR 35	**3.00**	**EA**	*359.08* **1,077**	*359.08* **1,077**	
2B 17 15" PVC Elbow SDR 35	**2.00**	**EA**	*588.22* **1,176**	*588.22* **1,176**	
2B 18 Install Pipe Hangers	**24.00**	**EA**	*86.23* **2,069**	*86.23* **2,069**	
2B 19 Remove and Replace Water Main	**1.00**	**LS**	**31,617**	**31,617**	
2B 20 Manhole per SPPWC std. 321-1	**2.00**	**EA**	*9,312.87* **18,626**	*9,312.87* **18,626**	
2B 21 Manhole per SPPWC std. 323-1	**1.00**	**EA**	*5,362.96* **5,363**	*5,362.96* **5,363**	
2B 22 Monolithic Connection per SPPWC std. 308-1	**1.00**	**EA**	*2,874.30* **2,874**	*2,874.30* **2,874**	
2B 23 Concrete Collar	**3.00**	**EA**	*1,137.42* **3,412**	*1,137.42* **3,412**	
2B 24 Concrete Slurry	**2.30**	**CY**	*1,873.34* **4,309**	*1,873.34* **4,309**	
2B 25 Flap Gate Inlet Per Detail	**2.00**	**EA**	*3,845.97* **7,692**	*3,845.97* **7,692**	
2B 26 Install Bulkhead	**1.00**	**EA**	*2,727.86* **2,728**	*2,727.86* **2,728**	
2B 27 Construct Debris Rack	**1.00**	**LS**	**33,054**	**33,054**	
2B 28 Subdrain System	**548.00**	**LF**	*215.57* **118,134**	*215.57* **118,134**	
2B 29 Remove and Replace Curb and Gutter	**512.00**	**LF**	*22.86* **11,705**	*22.86* **11,705**	
2B 30 Remove and Replace PCC Pavement and Agg. Base	**17,408.00**	**SF**	*13.15* **228,856**	*13.15* **228,856**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			13.60	*13.60*	
2B 31 Remove and Replace AC Pavement and Agg. Base	**4,550.00**	**SF**	**61,870**	**61,870**	
2B 32 Striping	**1.00**	**LS**	**12,727**	**12,727**	
			31.66	*31.66*	
2B 33 Install Chain Link Fence	**363.00**	**LF**	**11,492**	**11,492**	
2B 34 Landscape Irrigation	**1.00**	**LS**	**19,283**	**19,283**	
03 Reach 03	**1.00**	**LS**	**2,680,659**	**2,680,659**	
03 00 Mobilization / Demobilization	**1.00**	**LS**	**115,108**	**115,108**	
			77,824.95	*77,824.95*	
03 00 01 Mobilization	**1.00**	**EA**	**77,825**	**77,825**	
			37,282.98	*37,282.98*	
03 00 02 Demobilization	**1.00**	**EA**	**37,283**	**37,283**	
03 01 Demolition	**1.00**	**LS**	**154,608**	**154,608**	
			125.78	*125.78*	
03 01 02 Demo Riprap	**370.00**	**SY**	**46,538**	**46,538**	
			413.37	*413.37*	
03 01 03 Demo Grouted Rock	**152.00**	**SY**	**62,833**	**62,833**	
			15.95	*15.95*	
03 01 04 Demo Concrete Slope	**2,836.00**	**SF**	**45,238**	**45,238**	
03 02 Channel Grading	**1.00**	**LS**	**438,083**	**438,083**	
			24,605.52	*24,605.52*	
03 02 00 Clearing and Grubbing	**0.33**	**ACR**	**8,120**	**8,120**	
			43.48	*43.48*	
03 02 01 Excavate (Wall to Wall)	**6,080.00**	**CY**	**264,372**	**264,372**	
			36.52	*36.52*	
03 02 02 Excavate for Riprap Placement	**2,086.00**	**CY**	**76,179**	**76,179**	
			43.49	*43.49*	
03 02 03 Extra Excavation	**2,010.00**	**CY**	**87,407**	**87,407**	
			35.19	*35.19*	
03 02 04 Fill	**57.00**	**CY**	**2,006**	**2,006**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
03 03 Channel Wall	**1.00**	**LS**	**1,512,314**	**1,512,314**	
03 03 01 Wall Type A-1	**114.00**	**LF**	*7,974.08* **909,046**	*7,974.08* **909,046**	
03 03 01 01 Soldier Piles	**24.00**	**EA**	*26,437.95* **634,511**	*26,437.95* **634,511**	
03 03 01 02 Timber Lagging	**16.00**	**MBF**	*4,692.90* **75,086**	*4,692.90* **75,086**	
03 03 01 03 Concrete	**211.00**	**CY**	*631.97* **133,346**	*631.97* **133,346**	
03 03 01 04 Reinforcing Steel	**15.80**	**TON**	*3,416.21* **53,976**	*3,416.21* **53,976**	
03 03 01 05 Drainage Mat	**2,280.00**	**SF**	*1.92* **4,386**	*1.92* **4,386**	
03 03 01 06 Weep Holes	**23.00**	**EA**	*96.01* **2,208**	*96.01* **2,208**	
03 03 01 07 Underdrain Pipe	**114.00**	**LF**	*48.53* **5,532**	*48.53* **5,532**	
03 03 02 Wall Type D-1	**165.00**	**LF**	*3,656.17* **603,268**	*3,656.17* **603,268**	
03 03 02 01 Soldier Piles	**17.00**	**EA**	*19,024.11* **323,410**	*19,024.11* **323,410**	
03 03 02 02 Timber Lagging	**16.20**	**MBF**	*4,692.90* **76,025**	*4,692.90* **76,025**	
03 03 02 03 Concrete	**214.00**	**CY**	*631.66* **135,176**	*631.66* **135,176**	
03 03 02 04 Reinforcing Steel	**16.00**	**TON**	*3,416.21* **54,659**	*3,416.21* **54,659**	
03 03 02 05 Drainage Mat	**2,310.00**	**SF**	*1.92* **4,444**	*1.92* **4,444**	
03 03 02 06 Weep Holes	**16.00**	**EA**	*96.01* **1,536**	*96.01* **1,536**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			48.59	*48.59*	
03 03 02 07 Underdrain Pipe	**165.00**	**LF**	**8,018**	**8,018**	
03 04 Fill Material	**1.00**	**LS**	**207,076**	**207,076**	
			83.09	*83.09*	
03 04 01 Riprap	**2,012.00**	**TON**	**167,175**	**167,175**	
			83.09	*83.09*	
03 04 01 02 Channel Revetment Riprap	**1,561.00**	**TON**	**129,702**	**129,702**	
			83.09	*83.09*	
03 04 01 03 Drop Structures Riprap	**451.00**	**TON**	**37,473**	**37,473**	
			47.18	*47.18*	
03 04 02 Gravel	**596.00**	**TON**	**28,118**	**28,118**	
			47.18	*47.18*	
03 04 02 02 Channel Revetment Gravel	**520.00**	**TON**	**24,532**	**24,532**	
			47.18	*47.18*	
03 04 02 03 Drop Structures Gravel	**76.00**	**TON**	**3,585**	**3,585**	
			3.64	*3.64*	
03 04 03 Filter Material	**2,381.00**	**SY**	**8,657**	**8,657**	
			3.64	*3.64*	
03 04 03 02 Channel Revetment Geotextile	**2,081.00**	**SY**	**7,569**	**7,569**	
			3.64	*3.64*	
03 04 03 03 Drop Structures Geotextile	**299.00**	**SY**	**1,088**	**1,088**	
			9.01	*9.01*	
03 04 04 Native Soil	**347.00**	**CY**	**3,127**	**3,127**	
			9.01	*9.01*	
03 04 04 02 Channel Revetment Native Soil	**347.00**	**CY**	**3,127**	**3,127**	
			878.38	*878.38*	
03 06 Access Ramps	**36.00**	**CY**	**31,622**	**31,622**	
03 07 Fencing	**1.00**	**LS**	**24,653**	**24,653**	
			60.87	*60.87*	
03 07 01 Safety Fence	**405.00**	**LF**	**24,653**	**24,653**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			20.86	*20.86*	
03 08 Reinforced Gutter	**279.00**	**LF**	**5,820**	**5,820**	
03 09 Landscaping	**1.00**	**LS**	**72,914**	**72,914**	
03 10 Diversion and Control of Water	**1.00**	**LS**	**118,460**	**118,460**	
04 Reach 04	**1.00**	**LS**	**4,994,407**	**4,994,407**	
04 00 Mobilization / Demobilization	**1.00**	**LS**	**103,313**	**103,313**	
			69,850.21	*69,850.21*	
04 00 01 Mobilization	**1.00**	**EA**	**69,850**	**69,850**	
			33,462.59	*33,462.59*	
04 00 02 Demobilization	**1.00**	**EA**	**33,463**	**33,463**	
04 01 Demolition	**1.00**	**LS**	**78,040**	**78,040**	
			112.88	*112.88*	
04 01 02 Demo Riprap	**14.00**	**SY**	**1,580**	**1,580**	
			14.31	*14.31*	
04 01 04 Demo Concrete Slope	**5,344.00**	**SF**	**76,460**	**76,460**	
04 02 Channel Grading	**1.00**	**LS**	**428,608**	**428,608**	
			22,084.19	*22,084.19*	
04 02 00 Clearing and Grubbing	**0.42**	**ACR**	**9,275**	**9,275**	
			38.66	*38.66*	
04 02 01 Excavate (Wall to Wall)	**6,659.00**	**CY**	**257,453**	**257,453**	
			33.14	*33.14*	
04 02 02 Excavate for Riprap Placement	**2,016.00**	**CY**	**66,803**	**66,803**	
			38.66	*38.66*	
04 02 03 Extra Excavation	**2,448.00**	**CY**	**94,635**	**94,635**	
			31.58	*31.58*	
04 02 04 Fill	**14.00**	**CY**	**442**	**442**	
04 03 Channel Wall	**1.00**	**LS**	**3,899,433**	**3,899,433**	
			7,502.27	*7,502.27*	
04 03 01 Wall Type A-1	**40.00**	**LF**	**300,091**	**300,091**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			23,728.85	*23,728.85*	
04 03 01 01 Soldier Piles	**9.00**	**EA**	**213,560**	**213,560**	
			4,212.02	*4,212.02*	
04 03 01 02 Timber Lagging	**5.60**	**MBF**	**23,587**	**23,587**	
			567.10	*567.10*	
04 03 01 03 Concrete	**74.00**	**CY**	**41,965**	**41,965**	
			3,066.15	*3,066.15*	
04 03 01 04 Reinforcing Steel	**5.60**	**TON**	**17,170**	**17,170**	
			1.73	*1.73*	
04 03 01 05 Drainage Mat	**800.00**	**SF**	**1,381**	**1,381**	
			86.17	*86.17*	
04 03 01 06 Weep Holes	**8.00**	**EA**	**689**	**689**	
			43.44	*43.44*	
04 03 01 07 Underdrain Pipe	**40.00**	**LF**	**1,738**	**1,738**	
			5,664.25	*5,664.25*	
04 03 02 Wall Type B-1	**136.00**	**LF**	**770,338**	**770,338**	
			21,026.42	*21,026.42*	
04 03 02 01 Soldier Piles	**24.00**	**EA**	**504,634**	**504,634**	
			4,212.02	*4,212.02*	
04 03 02 02 Timber Lagging	**17.30**	**MBF**	**72,868**	**72,868**	
			566.44	*566.44*	
04 03 02 03 Concrete	**227.00**	**CY**	**128,583**	**128,583**	
			3,066.15	*3,066.15*	
04 03 02 04 Reinforcing Steel	**17.00**	**TON**	**52,125**	**52,125**	
			1.73	*1.73*	
04 03 02 05 Drainage Mat	**2,448.00**	**SF**	**4,227**	**4,227**	
			86.17	*86.17*	
04 03 02 06 Weep Holes	**23.00**	**EA**	**1,982**	**1,982**	
			43.53	*43.53*	
04 03 02 07 Underdrain Pipe	**136.00**	**LF**	**5,920**	**5,920**	
			6,188.11	*6,188.11*	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
04 03 03 Wall Type B-2	**104.00**	**LF**	**643,563**	**643,563**	
04 03 03 01 Soldier Piles	**18.00**	**EA**	*24,491.41* **440,845**	*24,491.41* **440,845**	
04 03 03 02 Timber Lagging	**13.20**	**MBF**	*4,212.02* **55,599**	*4,212.02* **55,599**	
04 03 03 03 Concrete	**173.00**	**CY**	*566.87* **98,069**	*566.87* **98,069**	
04 03 03 04 Reinforcing Steel	**13.00**	**TON**	*3,066.15* **39,860**	*3,066.15* **39,860**	
04 03 03 05 Drainage Mat	**1,872.00**	**SF**	*1.73* **3,232**	*1.73* **3,232**	
04 03 03 06 Weep Holes	**17.00**	**EA**	*86.17* **1,465**	*86.17* **1,465**	
04 03 03 07 Underdrain Pipe	**104.00**	**LF**	*43.20* **4,493**	*43.20* **4,493**	
04 03 04 Wall Type C-1	**58.00**	**LF**	*4,486.51* **260,217**	*4,486.51* **260,217**	
04 03 04 01 Soldier Piles	**8.00**	**EA**	*20,260.41* **162,083**	*20,260.41* **162,083**	
04 03 04 02 Timber Lagging	**6.60**	**MBF**	*3,778.40* **24,937**	*3,778.40* **24,937**	
04 03 04 03 Concrete	**86.00**	**CY**	*567.87* **48,837**	*567.87* **48,837**	
04 03 04 04 Reinforcing Steel	**6.40**	**TON**	*3,066.15* **19,623**	*3,066.15* **19,623**	
04 03 04 05 Drainage Mat	**928.00**	**SF**	*1.73* **1,602**	*1.73* **1,602**	
04 03 04 06 Weep Holes	**7.00**	**EA**	*86.17* **603**	*86.17* **603**	
04 03 04 07 Underdrain Pipe	**58.00**	**LF**	*43.64* **2,531**	*43.64* **2,531**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			3,252.07	*3,252.07*	
04 03 05 Wall Type D-1	**592.00**	**LF**	**1,925,223**	**1,925,223**	
			17,074.71	*17,074.71*	
04 03 05 01 Soldier Piles	**60.00**	**EA**	**1,024,482**	**1,024,482**	
			4,212.02	*4,212.02*	
04 03 05 02 Timber Lagging	**58.00**	**MBF**	**244,297**	**244,297**	
			567.08	*567.08*	
04 03 05 03 Concrete	**767.00**	**CY**	**434,951**	**434,951**	
			3,066.15	*3,066.15*	
04 03 05 04 Reinforcing Steel	**57.50**	**TON**	**176,303**	**176,303**	
			1.73	*1.73*	
04 03 05 05 Drainage Mat	**8,288.00**	**SF**	**14,310**	**14,310**	
			86.17	*86.17*	
04 03 05 06 Weep Holes	**59.00**	**EA**	**5,084**	**5,084**	
			43.57	*43.57*	
04 03 05 07 Underdrain Pipe	**592.00**	**LF**	**25,796**	**25,796**	
04 04 Fill Material	**1.00**	**LS**	**181,394**	**181,394**	
			74.57	*74.57*	
04 04 01 Riprap	**1,950.00**	**TON**	**145,421**	**145,421**	
			74.57	*74.57*	
04 04 01 02 Channel Revetment Riprap	**1,499.00**	**TON**	**111,788**	**111,788**	
			74.57	*74.57*	
04 04 01 03 Drop Structures Riprap	**451.00**	**TON**	**33,633**	**33,633**	
			42.34	*42.34*	
04 04 02 Gravel	**576.00**	**CY**	**24,390**	**24,390**	
			42.34	*42.34*	
04 04 02 02 Channel Revetment Gravel	**500.00**	**CY**	**21,172**	**21,172**	
			42.34	*42.34*	
04 04 02 03 Drop Structures Gravel	**76.00**	**CY**	**3,218**	**3,218**	
			3.26	*3.26*	
04 04 03 Filter Material	**2,298.00**	**SY**	**7,499**	**7,499**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			3.26	*3.26*	
04 04 03 02 Channel Revetment Geotextile	**1,998.00**	**SY**	**6,523**	**6,523**	
			3.26	*3.26*	
04 04 03 03 Drop Structures Geotextile	**299.00**	**SY**	**976**	**976**	
			12.27	*12.27*	
04 04 04 Native Soil	**333.00**	**CY**	**4,085**	**4,085**	
			12.27	*12.27*	
04 04 04 02 Channel Revetment Native Soil	**333.00**	**CY**	**4,085**	**4,085**	
			3,503.43	*3,503.43*	
04 05 Boulder Cluster	**1.00**	**EA**	**3,503**	**3,503**	
04 07 Fencing	**1.00**	**LS**	**53,869**	**53,869**	
			54.63	*54.63*	
04 07 01 Safety Fence	**986.00**	**LF**	**53,869**	**53,869**	
			14.04	*14.04*	
04 08 PCC Gutter	**930.00**	**LF**	**13,057**	**13,057**	
			106,481.49	*106,481.49*	
04 09 Landscaping	**1.00**	**EA**	**106,481**	**106,481**	
04 10 Diversion and Control of Water	**1.00**	**LS**	**126,708**	**126,708**	
05 Reach 05	**1.00**	**LS**	**6,611,284**	**6,611,284**	
05 00 Mobilization / Demobilization	**1.00**	**LS**	**98,697**	**98,697**	
			66,729.42	*66,729.42*	
05 00 01 Mobilization	**1.00**	**EA**	**66,729**	**66,729**	
			31,967.53	*31,967.53*	
05 00 02 Demobilization	**1.00**	**EA**	**31,968**	**31,968**	
05 01 Demolition	**1.00**	**LS**	**115,661**	**115,661**	
			354.48	*354.48*	
05 01 03 Demo Grouted Rock	**191.00**	**SY**	**67,705**	**67,705**	
			13.67	*13.67*	
05 01 04 Demo Concrete Slope	**1,905.00**	**SF**	**26,049**	**26,049**	
			12.96	*12.96*	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
05 01 05 Demo Concrete Bags	**1,690.00**	**SF**	**21,907**	**21,907**	
05 02 Channel Grading	**1.00**	**LS**	**436,958**	**436,958**	
05 02 00 Clearing and Grubbing	**0.39**	**ACR**	*21,097.50* **8,228**	*21,097.50* **8,228**	
05 02 01 Excavate (Wall to Wall)	**6,319.00**	**CY**	*37.29* **235,607**	*37.29* **235,607**	
05 02 02 Excavate for Riprap Placement	**2,901.00**	**CY**	*30.83* **89,431**	*30.83* **89,431**	
05 02 03 Extra Excavation	**2,764.00**	**CY**	*37.29* **103,057**	*37.29* **103,057**	
05 02 04 Fill	**21.00**	**CY**	*30.22* **635**	*30.22* **635**	
05 03 Channel Wall	**1.00**	**LS**	**5,420,367**	**5,420,367**	
05 03 01 Wall Type B-2	**668.00**	**LF**	*5,784.99* **3,864,370**	*5,784.99* **3,864,370**	
05 03 01 01 Soldier Piles	**112.00**	**EA**	*23,394.10* **2,620,140**	*23,394.10* **2,620,140**	
05 03 01 02 Timber Lagging	**84.50**	**MBF**	*4,023.83* **340,014**	*4,023.83* **340,014**	
05 03 01 03 Concrete	**1,113.00**	**CY**	*541.73* **602,942**	*541.73* **602,942**	
05 03 01 04 Reinforcing Steel	**83.50**	**TON**	*2,929.16* **244,585**	*2,929.16* **244,585**	
05 03 01 05 Drainage Mat	**12,024.00**	**SF**	*1.65* **19,833**	*1.65* **19,833**	
05 03 01 06 Weep Holes	**111.00**	**EA**	*82.32* **9,137**	*82.32* **9,137**	
05 03 01 07 Underdrain Pipe	**668.00**	**LF**	*41.50* **27,720**	*41.50* **27,720**	
05 03 02 Wall Type C-2	**76.00**	**LF**	*4,895.34* **372,046**	*4,895.34* **372,046**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			22,671.39	*22,671.39*	
05 03 02 01 Soldier Piles	**11.00**	**EA**	**249,385**	**249,385**	
			3,609.59	*3,609.59*	
05 03 02 02 Timber Lagging	**8.60**	**MBF**	**31,042**	**31,042**	
			540.07	*540.07*	
05 03 02 03 Concrete	**113.00**	**CY**	**61,028**	**61,028**	
			2,929.16	*2,929.16*	
05 03 02 04 Reinforcing Steel	**8.40**	**TON**	**24,605**	**24,605**	
			1.65	*1.65*	
05 03 02 05 Drainage Mat	**1,216.00**	**SF**	**2,006**	**2,006**	
			82.32	*82.32*	
05 03 02 06 Weep Holes	**10.00**	**EA**	**823**	**823**	
			41.53	*41.53*	
05 03 02 07 Underdrain Pipe	**76.00**	**LF**	**3,156**	**3,156**	
			3,402.16	*3,402.16*	
05 03 03 Wall Type D-2	**348.00**	**LF**	**1,183,952**	**1,183,952**	
			19,225.91	*19,225.91*	
05 03 03 01 Soldier Piles	**36.00**	**EA**	**692,133**	**692,133**	
			3,609.59	*3,609.59*	
05 03 03 02 Timber Lagging	**34.10**	**MBF**	**123,087**	**123,087**	
			541.73	*541.73*	
05 03 03 03 Concrete	**451.00**	**CY**	**244,322**	**244,322**	
			2,929.16	*2,929.16*	
05 03 03 04 Reinforcing Steel	**33.80**	**TON**	**99,005**	**99,005**	
			1.65	*1.65*	
05 03 03 05 Drainage Mat	**4,872.00**	**SF**	**8,036**	**8,036**	
			82.32	*82.32*	
05 03 03 06 Weep Holes	**35.00**	**EA**	**2,881**	**2,881**	
			41.63	*41.63*	
05 03 03 07 Underdrain Pipe	**348.00**	**LF**	**14,487**	**14,487**	
05 04 Fill Material	**1.00**	**LS**	**246,103**	**246,103**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			71.25	*71.25*	
05 04 01 Riprap	**2,746.00**	**TON**	**195,639**	**195,639**	
			71.24	*71.24*	
05 04 01 02 Channel Revetment Riprap	**2,295.00**	**TON**	**163,487**	**163,487**	
			71.29	*71.29*	
05 04 01 03 Drop Structures Riprap	**451.00**	**TON**	**32,152**	**32,152**	
			40.45	*40.45*	
05 04 02 Gravel	**841.00**	**TON**	**34,014**	**34,014**	
			40.46	*40.46*	
05 04 02 02 Channel Revetment Gravel	**765.00**	**TON**	**30,954**	**30,954**	
			40.27	*40.27*	
05 04 02 03 Drop Structures Gravel	**76.00**	**TON**	**3,060**	**3,060**	
			3.12	*3.12*	
05 04 03 Filter Material	**3,359.00**	**SY**	**10,473**	**10,473**	
			3.12	*3.12*	
05 04 03 02 Channel Revetment Geotextile	**3,059.00**	**SY**	**9,541**	**9,541**	
			3.12	*3.12*	
05 04 03 03 Drop Structures Geotextile	**299.00**	**SY**	**933**	**933**	
			11.72	*11.72*	
05 04 04 Native Soil	**510.00**	**CY**	**5,976**	**5,976**	
			11.72	*11.72*	
05 04 04 02 Channel Revetment Native Soil	**510.00**	**CY**	**5,976**	**5,976**	
			3,334.78	*3,334.78*	
05 05 Boulder Cluster	**2.00**	**EA**	**6,670**	**6,670**	
05 07 Fencing	**1.00**	**LS**	**56,369**	**56,369**	
			52.19	*52.19*	
05 07 01 Safety Fence	**1,080.00**	**LF**	**56,369**	**56,369**	
			13.42	*13.42*	
05 08 PCC Gutter	**1,092.00**	**LF**	**14,654**	**14,654**	
			82,442.81	*82,442.81*	
05 09 Landscaping	**1.00**	**EA**	**82,443**	**82,443**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
05 10 Diversion and Control of Water	**1.00**	**LS**	**133,364**	**133,364**	
06 Reach 06	**1.00**	**LS**	**5,109,722**	**5,109,722**	
06 00 Mobilization / Demobilization	**1.00**	**LS**	**102,963**	**102,963**	
06 00 01 Mobilization	**1.00**	**EA**	*69,613.88* **69,614**	*69,613.88* **69,614**	
06 00 02 Demobilization	**1.00**	**EA**	*33,349.37* **33,349**	*33,349.37* **33,349**	
06 01 Demolition	**1.00**	**LS**	**176,210**	**176,210**	
06 01 01 Demo Gabion	**149.00**	**SY**	*206.00* **30,693**	*206.00* **30,693**	
06 01 02 Demo Riprap	**64.00**	**SY**	*116.83* **7,477**	*116.83* **7,477**	
06 01 03 Demo Grouted Rock	**333.00**	**SY**	*369.74* **123,122**	*369.74* **123,122**	
06 01 05 Demo Concrete Bags	**172.00**	**SF**	*86.72* **14,916**	*86.72* **14,916**	
06 02 Channel Grading	**1.00**	**LS**	**380,553**	**380,553**	
06 02 00 Clearing and Grubbing	**0.38**	**ACR**	*22,009.47* **8,364**	*22,009.47* **8,364**	
06 02 01 Excavate (Wall to Wall)	**3,730.00**	**CY**	*38.90* **145,092**	*38.90* **145,092**	
06 02 02 Excavate for Riprap Placement	**4,849.00**	**CY**	*32.16* **155,943**	*32.16* **155,943**	
06 02 03 Extra Excavation	**1,754.00**	**CY**	*38.90* **68,228**	*38.90* **68,228**	
06 02 04 Fill	**93.00**	**CY**	*31.48* **2,927**	*31.48* **2,927**	
06 03 Channel Wall	**1.00**	**LS**	**3,710,646**	**3,710,646**	
06 03 01 Wall Type A-2	**124.00**	**LF**	*7,902.13* **979,864**	*7,902.13* **979,864**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			27,390.37	*27,390.37*	
06 03 01 01 Soldier Piles	**26.00**	**EA**	**712,150**	**712,150**	
			4,197.77	*4,197.77*	
06 03 01 02 Timber Lagging	**17.50**	**MBF**	**73,461**	**73,461**	
			564.80	*564.80*	
06 03 01 03 Concrete	**230.00**	**CY**	**129,905**	**129,905**	
			3,055.77	*3,055.77*	
06 03 01 04 Reinforcing Steel	**17.20**	**TON**	**52,559**	**52,559**	
			1.72	*1.72*	
06 03 01 05 Drainage Mat	**2,480.00**	**SF**	**4,267**	**4,267**	
			85.88	*85.88*	
06 03 01 06 Weep Holes	**25.00**	**EA**	**2,147**	**2,147**	
			43.34	*43.34*	
06 03 01 07 Underdrain Pipe	**124.00**	**LF**	**5,375**	**5,375**	
			6,099.56	*6,099.56*	
06 03 02 Wall Type B-2	**276.00**	**LF**	**1,683,479**	**1,683,479**	
			24,405.78	*24,405.78*	
06 03 02 01 Soldier Piles	**47.00**	**EA**	**1,147,072**	**1,147,072**	
			4,197.77	*4,197.77*	
06 03 02 02 Timber Lagging	**34.90**	**MBF**	**146,502**	**146,502**	
			565.23	*565.23*	
06 03 02 03 Concrete	**460.00**	**CY**	**260,006**	**260,006**	
			3,055.77	*3,055.77*	
06 03 02 04 Reinforcing Steel	**34.50**	**TON**	**105,424**	**105,424**	
			1.72	*1.72*	
06 03 02 05 Drainage Mat	**4,968.00**	**SF**	**8,549**	**8,549**	
			85.88	*85.88*	
06 03 02 06 Weep Holes	**46.00**	**EA**	**3,950**	**3,950**	
			43.39	*43.39*	
06 03 02 07 Underdrain Pipe	**276.00**	**LF**	**11,976**	**11,976**	
			4,935.20	*4,935.20*	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
06 03 03 Wall Type C-2	**80.00**	**LF**	**394,816**	**394,816**	
			23,642.37	*23,642.37*	
06 03 03 01 Soldier Piles	**11.00**	**EA**	**260,066**	**260,066**	
			3,765.62	*3,765.62*	
06 03 03 02 Timber Lagging	**9.00**	**MBF**	**33,891**	**33,891**	
			564.16	*564.16*	
06 03 03 03 Concrete	**119.00**	**CY**	**67,135**	**67,135**	
			3,055.77	*3,055.77*	
06 03 03 04 Reinforcing Steel	**8.90**	**TON**	**27,196**	**27,196**	
			1.72	*1.72*	
06 03 03 05 Drainage Mat	**1,280.00**	**SF**	**2,203**	**2,203**	
			85.88	*85.88*	
06 03 03 06 Weep Holes	**10.00**	**EA**	**859**	**859**	
			43.33	*43.33*	
06 03 03 07 Underdrain Pipe	**80.00**	**LF**	**3,466**	**3,466**	
			3,546.13	*3,546.13*	
06 03 04 Wall Type D-2	**184.00**	**LF**	**652,488**	**652,488**	
			20,056.97	*20,056.97*	
06 03 04 01 Soldier Piles	**19.00**	**EA**	**381,082**	**381,082**	
			3,765.62	*3,765.62*	
06 03 04 02 Timber Lagging	**18.00**	**MBF**	**67,781**	**67,781**	
			564.70	*564.70*	
06 03 04 03 Concrete	**239.00**	**CY**	**134,963**	**134,963**	
			3,055.77	*3,055.77*	
06 03 04 04 Reinforcing Steel	**17.90**	**TON**	**54,698**	**54,698**	
			1.72	*1.72*	
06 03 04 05 Drainage Mat	**2,576.00**	**SF**	**4,433**	**4,433**	
			85.88	*85.88*	
06 03 04 06 Weep Holes	**18.00**	**EA**	**1,546**	**1,546**	
			43.39	*43.39*	
06 03 04 07 Underdrain Pipe	**184.00**	**LF**	**7,985**	**7,985**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
06 04 Fill Material	**1.00**	**LS**	**424,034**	**424,034**	
06 04 01 Riprap	**4,499.00**	**TON**	*74.32* **334,376**	*74.32* **334,376**	
06 04 01 02 Channel Revetment Riprap	**4,048.00**	**TON**	*74.32* **300,857**	*74.32* **300,857**	
06 04 01 03 Drop Structures Riprap	**451.00**	**TON**	*74.32* **33,519**	*74.32* **33,519**	
06 04 02 Gravel	**1,425.00**	**TON**	*42.20* **60,135**	*42.20* **60,135**	
06 04 02 02 Channel Revetment Gravel	**1,349.00**	**TON**	*42.20* **56,928**	*42.20* **56,928**	
06 04 02 03 Drop Structures Gravel	**76.00**	**TON**	*42.20* **3,207**	*42.20* **3,207**	
06 04 03 Filter Material	**5,696.00**	**SY**	*3.25* **18,533**	*3.25* **18,533**	
06 04 03 02 Channel Revetment Geotextile	**5,397.00**	**SY**	*3.25* **17,560**	*3.25* **17,560**	
06 04 03 03 Drop Structures Geotextile	**299.00**	**SY**	*3.25* **973**	*3.25* **973**	
06 04 04 Native Soil	**899.00**	**CY**	*12.22* **10,990**	*12.22* **10,990**	
06 04 04 02 Channel Revetment Native Soil	**899.00**	**CY**	*12.22* **10,990**	*12.22* **10,990**	
06 05 Boulder Cluster	**1.00**	**EA**	*3,491.58* **3,492**	*3,491.58* **3,492**	
06 06 Access Ramps	**29.00**	**CY**	*782.61* **22,696**	*782.61* **22,696**	
06 07 Fencing	**1.00**	**LS**	**49,871**	**49,871**	
06 07 01 Safety Fence	**653.00**	**LF**	*54.45* **35,555**	*54.45* **35,555**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			50.10	*50.10*	
06 07 02 Access Fence	**226.00**	**LF**	**11,323**	**11,323**	
			2,992.70	*2,992.70*	
06 07 03 Access Gate	**1.00**	**EA**	**2,993**	**2,993**	
			14.01	*14.01*	
06 08 PCC Gutter	**664.00**	**LF**	**9,300**	**9,300**	
			103,250.85	*103,250.85*	
06 09 Landscaping	**1.00**	**EA**	**103,251**	**103,251**	
06 10 Diversion and Control of Water	**1.00**	**LS**	**126,707**	**126,707**	
07 Reach 07	**1.00**	**LS**	**7,283,276**	**7,283,276**	
07 00 Mobilization / Demobilization	**1.00**	**LS**	**100,117**	**100,117**	
			67,689.26	*67,689.26*	
07 00 01 Mobilization	**1.00**	**EA**	**67,689**	**67,689**	
			32,427.36	*32,427.36*	
07 00 02 Demobilization	**1.00**	**EA**	**32,427**	**32,427**	
07 01 Demolition	**1.00**	**LS**	**66,377**	**66,377**	
			109.40	*109.40*	
07 01 02 Demo Riprap	**226.00**	**SY**	**24,725**	**24,725**	
			13.16	*13.16*	
07 01 05 Demo Concrete Bags	**3,166.00**	**SF**	**41,652**	**41,652**	
07 02 Channel Grading	**1.00**	**LS**	**553,086**	**553,086**	
			21,400.97	*21,400.97*	
07 02 00 Clearing and Grubbing	**0.60**	**ACR**	**12,841**	**12,841**	
			37.82	*37.82*	
07 02 01 Excavate (Wall to Wall)	**6,033.00**	**CY**	**228,173**	**228,173**	
			31.27	*31.27*	
07 02 02 Excavate for Riprap Placement	**4,970.00**	**CY**	**155,433**	**155,433**	
			37.82	*37.82*	
07 02 03 Extra Excavation	**3,918.00**	**CY**	**148,189**	**148,189**	
			27.89	*27.89*	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
07 02 04 Fill	**303.00**	**CY**	**8,451**	**8,451**	
07 03 Channel Wall	**1.00**	**LS**	**5,728,532**	**5,728,532**	
07 03 01 Wall Type A-2	**32.00**	**LF**	*7,914.70* **253,270**	*7,914.70* **253,270**	
07 03 01 01 Soldier Piles	**7.00**	**EA**	*26,633.11* **186,432**	*26,633.11* **186,432**	
07 03 01 02 Timber Lagging	**4.50**	**MBF**	*4,081.71* **18,368**	*4,081.71* **18,368**	
07 03 01 03 Concrete	**59.00**	**CY**	*550.53* **32,481**	*550.53* **32,481**	
07 03 01 04 Reinforcing Steel	**4.40**	**TON**	*2,971.29* **13,074**	*2,971.29* **13,074**	
07 03 01 05 Drainage Mat	**640.00**	**SF**	*1.67* **1,071**	*1.67* **1,071**	
07 03 01 06 Weep Holes	**6.00**	**EA**	*83.50* **501**	*83.50* **501**	
07 03 01 07 Underdrain Pipe	**32.00**	**LF**	*42.01* **1,344**	*42.01* **1,344**	
07 03 02 Wall Type B-2	**222.00**	**LF**	*5,952.68* **1,321,495**	*5,952.68* **1,321,495**	
07 03 02 01 Soldier Piles	**38.00**	**EA**	*23,731.04* **901,780**	*23,731.04* **901,780**	
07 03 02 02 Timber Lagging	**28.10**	**MBF**	*4,081.71* **114,696**	*4,081.71* **114,696**	
07 03 02 03 Concrete	**370.00**	**CY**	*549.40* **203,278**	*549.40* **203,278**	
07 03 02 04 Reinforcing Steel	**27.80**	**TON**	*2,971.29* **82,602**	*2,971.29* **82,602**	
07 03 02 05 Drainage Mat	**3,996.00**	**SF**	*1.67* **6,686**	*1.67* **6,686**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			83.50	*83.50*	
07 03 02 06 Weep Holes	**37.00**	**EA**	**3,090**	**3,090**	
			42.18	*42.18*	
07 03 02 07 Underdrain Pipe	**222.00**	**LF**	**9,364**	**9,364**	
			4,565.69	*4,565.69*	
07 03 03 Wall Type C-2	**416.00**	**LF**	**1,899,327**	**1,899,327**	
			22,988.73	*22,988.73*	
07 03 03 01 Soldier Piles	**53.00**	**EA**	**1,218,403**	**1,218,403**	
			3,661.51	*3,661.51*	
07 03 03 02 Timber Lagging	**47.00**	**MBF**	**172,091**	**172,091**	
			549.52	*549.52*	
07 03 03 03 Concrete	**616.00**	**CY**	**338,506**	**338,506**	
			2,971.29	*2,971.29*	
07 03 03 04 Reinforcing Steel	**46.20**	**TON**	**137,274**	**137,274**	
			1.67	*1.67*	
07 03 03 05 Drainage Mat	**6,656.00**	**SF**	**11,137**	**11,137**	
			83.50	*83.50*	
07 03 03 06 Weep Holes	**52.00**	**EA**	**4,342**	**4,342**	
			42.25	*42.25*	
07 03 03 07 Underdrain Pipe	**416.00**	**LF**	**17,575**	**17,575**	
			3,415.82	*3,415.82*	
07 03 04 Wall Type D-2	**660.00**	**LF**	**2,254,440**	**2,254,440**	
			19,502.46	*19,502.46*	
07 03 04 01 Soldier Piles	**67.00**	**EA**	**1,306,665**	**1,306,665**	
			3,661.51	*3,661.51*	
07 03 04 02 Timber Lagging	**65.00**	**MBF**	**237,998**	**237,998**	
			549.27	*549.27*	
07 03 04 03 Concrete	**856.00**	**CY**	**470,172**	**470,172**	
			2,971.29	*2,971.29*	
07 03 04 04 Reinforcing Steel	**64.20**	**TON**	**190,757**	**190,757**	
			1.67	*1.67*	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
07 03 04 05 Drainage Mat	**9,240.00**	**SF**	**15,460**	**15,460**	
			83.50	*83.50*	
07 03 04 06 Weep Holes	**66.00**	**EA**	**5,511**	**5,511**	
			42.24	*42.24*	
07 03 04 07 Underdrain Pipe	**660.00**	**LF**	**27,877**	**27,877**	
07 04 Fill Material	**1.00**	**LS**	**429,761**	**429,761**	
			72.26	*72.26*	
07 04 01 Riprap	**4,743.00**	**CY**	**342,746**	**342,746**	
			72.27	*72.27*	
07 04 01 02 Channel Revetment Riprap	**3,841.00**	**CY**	**277,580**	**277,580**	
			72.25	*72.25*	
07 04 01 03 Drop Structures Riprap	**902.00**	**CY**	**65,167**	**65,167**	
			41.04	*41.04*	
07 04 02 Gravel	**1,432.00**	**CY**	**58,767**	**58,767**	
			41.03	*41.03*	
07 04 02 02 Channel Revetment Gravel	**1,280.00**	**CY**	**52,523**	**52,523**	
			41.08	*41.08*	
07 04 02 03 Drop Structures Gravel	**152.00**	**CY**	**6,244**	**6,244**	
			3.16	*3.16*	
07 04 03 Filter Material	**5,720.00**	**SY**	**18,096**	**18,096**	
			3.16	*3.16*	
07 04 03 02 Channel Revetment Geotextile	**5,121.00**	**SY**	**16,201**	**16,201**	
			3.16	*3.16*	
07 04 03 03 Drop Structures Geotextile	**599.00**	**SY**	**1,895**	**1,895**	
			11.89	*11.89*	
07 04 04 Native Soil	**854.00**	**CY**	**10,151**	**10,151**	
			11.89	*11.89*	
07 04 04 02 Channel Revetment Native Soil	**854.00**	**CY**	**10,151**	**10,151**	
			3,395.05	*3,395.05*	
06 05 Boulder Cluster	**2.00**	**EA**	**6,790**	**6,790**	

Description	Quantity	UOM	ContractCost	ProjectCost	C/O
			760.97	*760.97*	
07 06 Access Ramps	**54.00**	**CY**	**41,093**	**41,093**	
07 07 Fencing	**1.00**	**LS**	**73,272**	**73,272**	
			52.94	*52.94*	
07 07 01 Safety Fence	**1,329.00**	**LF**	**70,362**	**70,362**	
			2,909.96	*2,909.96*	
07 07 03 Access Gate	**1.00**	**EA**	**2,910**	**2,910**	
			13.60	*13.60*	
07 08 PCC Gutter	**1,330.00**	**LF**	**18,086**	**18,086**	
			88,044.55	*88,044.55*	
07 09 Landscaping	**1.00**	**EA**	**88,045**	**88,045**	
07 10 Diversion and Control of Water	**1.00**	**LS**	**178,118**	**178,118**	

APPENDIX 11

ASACS Economic Appendix 2004

Exhibit 7-A

Los Angeles District

Lower Mission Creek

Economic Appendix

Economic & Social Analysis Section
November 2004

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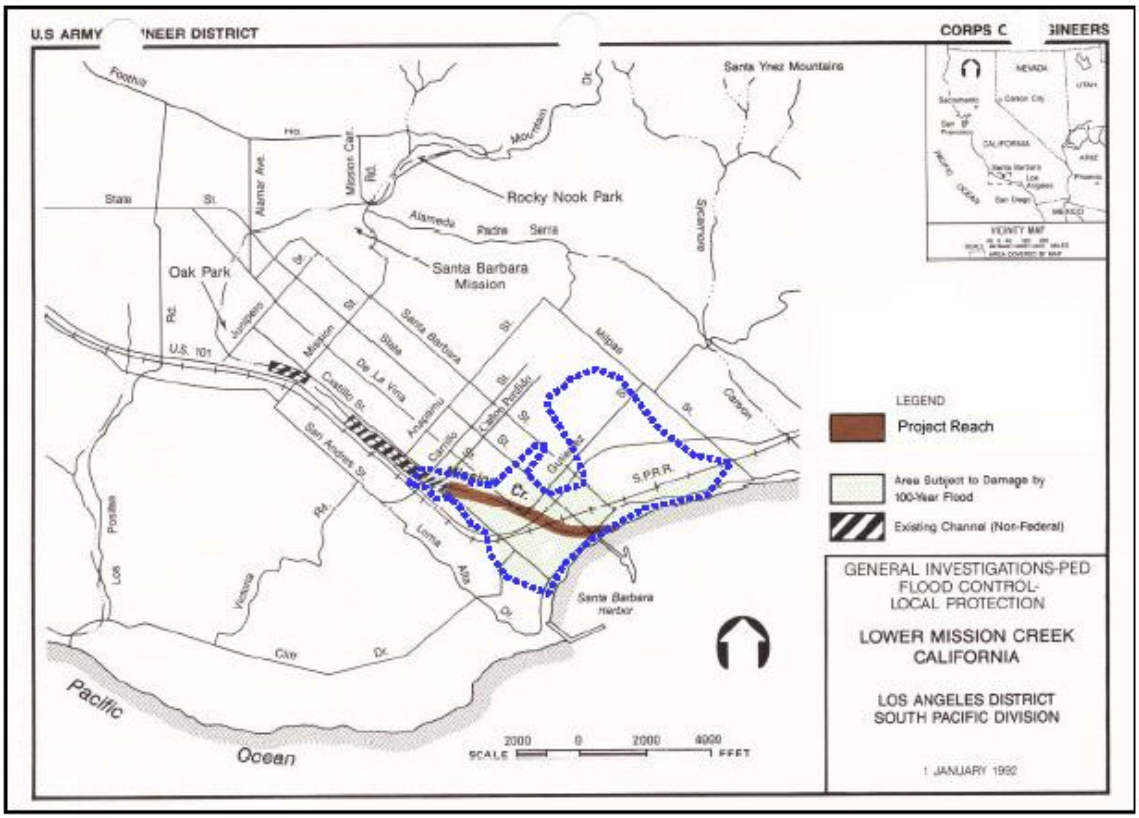
1 The Study

This economic appendix for Lower Mission Creek will re-evaluate the project benefits for a Post Authorization Change Report (PAC). Since the authorization in 2000, the project has undergone changes that caused the cost to increase above the limitation prescribed in Section 902 of WRDA 86. Congress authorized the project at an estimated cost of $18,300,000. The current revised cost estimate is $27,897,000 (FY 2004 price level), which exceeds the maximum allowable by $5,230,000. This report will review the changes in policies and methodologies that have occurred since the authorization of the original report in 1999.

A Study Area

The study area covers the drainage areas of Lower Mission Creek and Laguna Channel. Both drainage areas are located within the Santa Barbara city limits in southern Santa Barbara County. The 1999 Feasibility Report evaluated the drainage area of Mission Creek from Cannon Perdido Street (in the City of Santa Barbara) to the Pacific Ocean. Laguna Channel drainage is south of the Mission Creek drainage area and covers the area from De La Guerra Street to the Pacific Ocean. The economic evaluation for the PAC report will be based on the same study area. Figure E1 shows map of the study area.

Figure E1.



B Study Purpose and Scope

The purpose of the original feasibility report was to present an economic analysis that measured beneficial contributions to National Economic Development (NED) from the implementation of a flood control alternative within the Lower Mission Creek/Laguna Channel. The report recommended a plan that provided 20-year level protection or capacity of 3,400 cfs.

This evaluation will re-evaluate the damages and benefits of the original NED Plan that was identified in the 1999 evaluation. This new evaluation will review the changes in policies and methodologies that have occurred since 1999. Some of the changes in policies and methodologies that have occurred since 1999 include the following: construction of new buildings within the floodplain, development of residential and commercial depth-damage curves, increases in building costs (Marshall & Swift), and changes in FEMA overhead costs. Also, the report will present data from the original evaluation in 1999 to compare the changes between the two evaluations.

The scope of this economic assessment consists of re-evaluating the annual damages that are expected to occur in the Lower Mission Creek/Laguna Channel floodplain. Lower Mission Creek drains an 11.5 square mile area located in central and downtown Santa Barbara into the Pacific Ocean. Lower Mission Creek floods frequently, causing severe damage in residential, commercial, and industrial areas. The Laguna Channel drainage area was included in the economic assessment based on historical overflows of Lower Mission Creek flowing into its drainage basin.

C Historical Flood Damage

Historical flooding in Lower Mission Creek dates back to 1862. The most significant recent floods occurred successively in January and February of 1995. Table E1 lists the historical flood damages. The damages from the following flood events include damages to structures and contents. The update of historical damages from 1999 to 2004 was based on price indexes in the Civil Works Construction Cost Indexes System (CWCCIS).

Table E1
Lower Mission Creek
Historical Flood Damages
Source: City of Santa Barbara
2004 Price Levels

Flood Event	Damages	Annual Frequency
March, 1995	$6,168,000	9-year
January, 1995	$13,298,000	55-year
January, 1983	$2,078,000	10-year
February, 1978	$2,347,000	11-year
January, 1967	$4,417,000	NA

2 Demographics

A Socio-economic Profile

The city of Santa Barbara is located within Santa Barbara County, 80 miles north of Los Angeles. Santa Barbara is located along the South Coast Highway 101 and is bordered on its western side by the Pacific Ocean. The community is convenient to Los Angeles and other coastal cities along the Pacific Ocean in Southern California.

B Population

Approximately 60-percent of Californians are living in Southern California, a distribution that has not changed significantly in the past four decades. In addition, almost 75-precent of Californians live in the coastal regions, with the inland dwelling proportion increasing steadily over the past 3 decades

As a result of the recession in the early 1990s, the population of California experienced a massive emigration and the slowest recorded population growth for any decade. The domestic migration exodus consisted mainly of people leaving Southern California (Los Angeles, Orange, and Ventura Counties). Santa Barbara County, however, has still managed to grow from 369,000 in 1990 to 399,347 in 2000.

The population of Santa Barbara County in 2000 comprised 1.25-precent of the population of California; the county population was 399,347 and the State population was 33,871,648. As shown in Table E2, the county experienced a net population increase of almost 8-percent between 1990 and 2000. This rate of growth is slightly below the rate for California has a whole 8.2-percent during the same period. Using the U.S. Bureau of Economic Analysis projection data for the State of California, the state is expected to experience a population increase of more than 28-precent by 2025, a considerable faster rate of growth than the United States at 23%-percent.

The City of Santa Barbara has experienced a net increase of over 6,754 people since 1990, an increase of 9.3-percent. The median age of the population of Santa Barbara is

34.6 years. Santa Barbara County's median age is 33.4 years, and the median age for California is 33.6 years. Santa Barbara County has a population of 50,765 of people over the age of 65, which is 12.7-percent of the population.

Using 2000 Census reports, the population of the City of Santa Barbara is 77-percent Caucasian. Minority populations include: Asian (2.9%), American Indian and Alaskan Native (1.1%), African American (1.8%), Native Hawaiian (0.1%); and Other (17%). Approximately 35-percent of the population is of Hispanic or Latino heritage. There are 35,605 households and the average household size is 2.47 persons.

Table E2
Lower Mission Creek
Comparative Population Data (1980-2025)

	1980	1990	2000	2025
Santa Barbara	74,414	85,571	92,325	101,067
Santa Barbara County	298,694	369,608	399,347	576,448
California	23,667,764	29,760,021	33,871,648	43,601,763
United States	226,549,000	248,709,873	281,421,906	344,683,537

C Employment

Table E3 indicates the predominant sectors of employment for residents of the study area, according to the Profile of Selected Economic Characteristics: 2000, recently published by the U.S. Census Bureau. As shown in the table, the service industry is important in all regions associated with the study area. The service industries include: information; professional, scientific, management, administrative, and waste management services; educational, health and social services; arts, entertainment, recreation, accommodation and foodservices; public administration; and other services.

In 2002, the value of agricultural production was $775.1 million. This ranks the county 13th in the state of California. Leading agricultural commodities include strawberries, broccoli, wine grapes, head lettuce, and cauliflower.

In Santa Barbara County, the unemployment rate in 2002 was 4.2-percent up from 3.5-percent in 2001. The city of Santa Barbara has a rate of 3.9-percent, a little lower than the county rate and much lower than California, which is 6.7-percent.

Table E3
Lower Mission Creek
Employment by Industry, (2000)

Industry	Santa Barbara	Santa Barbara County	California
Industry Total	505,705	179,900	14,718,928
Farming & Mining	282	15,300	282,717
Construction	3,138	8,000	915,023
Manufacturing	5,036	13,400	1,930,141
Wholesale & Retail Trade	7,056	24,600	2,237,552
Transportation & Warehousing, & Utilities	3,816	28,100	689,387
Finance, Insurance & Real Estate	19,521	44,500	1,016,916
Services	8,910	25,400	7,647,192

D Income

Table E4 summarizes pertinent information regarding income and effective buying power by household in the study area. Services are the largest growth industry in Santa Barbara County, accounting for 18.9-percent growth since 1999. Retail trade is second at 11.4-percent, and government is 9.6-percent. The civilian labor force has increased to 206,600, and increase of 1.5-precent since 1998. Government, trade, transportation and utilities, and leisure and hospitality are the largest industries in the county. The Government is the largest employer, providing 35,600 jobs, almost 20-percent of all employment. The trade, transportation and utilities industries provides 15.6-percent of all employment, over 72-percent are in retail trade. Slightly more than 14-percent of the county population was living below the poverty level in 2001. The median income of households in Santa Barbara County was $46,677. Eighty percent of the households received earnings and 16-percent received retirement income other than Social Security. Twenty-five percent of the households received Social Security. The average income from Social Security was $13,153. As shown in Table E4, the per capita income is lower, and the median household income in the study area is higher than figures for the county and state.

Table E4
Lower Mission Creek
Income Levels by Household, (2000)

Income Distribution	Santa Barbara	Santa Barbara County	California
Total Housholds	36,317	136,769	11,512,020
Less than $15,000	4,479	18,268	1,615,869
$15,000-$24,999	3,561	15,498	1,318,246
$25,000-$34,999	3,744	16,968	1,315,085
$35,000-$49,999	5,674	21,754	1,745,961
$50,000-74,999	6,819	26,510	2,202,873
$75,000 or more	12,040	37,771	3,313,986
Median Household Income	$52,570	$46,667	$47,493
Per Capita Income	$28,732	$23,059	$22,711

E Transportation

There are 346,994 vehicles registered in Santa Barbara County alone. In 2003, the county had over 1,668 miles of streets, roads, and highways. Major interstate highways servicing the county include the U.S. Highway 101, Highway 1 (running from Pismo beach down to Gaviota). The mean travel time to work in the county is approximately 16.7 minutes, and 66-percent of the workers drive alone. The county has an airport in Santa Barbara that has a few major carriers, but services mostly commuter flights. Santa Barbara County has an Amtrak Station that is located in Santa Barbara. The station is served daily by *Coast Starlight* trains to and from Los Angeles, Oregon and Washington, and Amtrak California's *Pacific Surfliners* to and from San Diego and Los Angeles. Other trains extend north to San Luis Obispo. While Amtrak Motor Coach services *San Joaquin* and some *Pacific Surfliners* trains.

3 Methodology

A Guidance and Regulation

This economic assessment is formulated to be in accordance with ER 1105-2-100. Further, benefits and costs expressed as annual values are calculated utilizing the FY04 discount rate of 5 5/8 percent with a project life of fifty-years. All benefits are costs are expressed at 2004 price level. In addition, this report will display the economic analysis that was completed for the WRDA 2000 submission. The WRDA 2000 analysis was based on a discount rate of 6 5/8 percent and price level of 1999.

B Computer-based Models and Reference Sources

The following items were utilized for the economic assessment of Lower Mission Creek and Laguna Channel.

Models:

(1) HEC's Flood Damage Reduction Analysis (HEC-FDA)
(2) HEC's Expected Annual Damage (EAD) model

References:

(1) Marshall & Swift Evaluation Services
(2) Depth Damage Relationships - Expert Panel Meeting, Houma, Louisiana, January 22, 1997
(3) EGM 04-01, Generic Depth-Damage Relationships for Residential Structures
(4) First American Real Estate Database

C Database Field Survey

The original field survey was conducted in 1997 and was based on 100% field survey. The survey recorded the following items: relative First Floor Elevation (FFE), structure type, structure condition, and structure use. Another field survey was conducted in February of 2004. The purpose of the most recent survey in 2004 was to verify any changes to residential and commercial development in the floodplain.

D Topographic Mapping

The Lower Mission Creek floodplain was topographically mapped at a 2-foot contour interval. This mapping and field survey FFEs were combined to estimate absolute FFE.

E Reach Delineation

Economics, Hydrology, and Hydraulics study members participated in the segmenting of the Lower Mission Creek and the Laguna Channel study area into six major reaches of homogenous characteristics. Reaches 1 through 4 in the Lower Mission Creek study area were segmented into sub-reaches to differentiate characteristics within these major reaches. Critical factors for differentiation included: discharge/frequency characteristics, overflow spatial characteristics, and economic activity.

Table E5
Lower Mission Creek
Reaches

Reach Name	Sub-reach Name	Creek Bank	Reach Location
Reach 1	Rch 1 Left	East	From the creek to De La Vina St. and Bradbury Ave.
	Rch 1 LL	East	East of De La Vina St. and Bradbury Ave. to Anacapa St.
	Rch 1 Right	West	From the creek to U.S. Highway 101
Reach 2	Rch 2 Left	East	From the creek to Brinkoff Ave.
	Rch 2 LL	East	East of Brinkoff Avenue to Santa Barbara St.
	Rch 2 Right	West	From the creek to U.S. Highway 101
Reach 3	Rch 3 Left	East	From the creek to Brinkoff Ave.
	Rch 3 LL	East	From the creek to Brinkoff Ave.
	Rch 3 Right	West	From the creek to U.S. Highway 101
Reach 4	Rch 4 Left	East	From the creek to Laguna Drainage Channel
	Rch 4 Left X	East	From the creek to Laguna Drainage Channel
	Rch 4 Right	West	From the creek to Burton Circle
	Rch 4 Right X	West	From the creek to Los Aquajes
	Rch 4 Right XX	West	From the creek to Castillo Street
	Rch 4 RRE	West	West of Burton Circle to Castillo St.
	Rch 4 RRW	West	West of Burton to Santa Barbara City College
Laguan Reach 1	NA	NA	North of Highway 101
Laguna Reach 2	NA	NA	South of Highway 101

4 Without Project Conditions

A Floodplain Inventory

A site survey of the floodplain was conducted in 1997 and 2004 to estimate the structures depreciated replacement value. The structure values were based on information provided by Santa Barbara County's Clerk-Recorder Assessor Office, construction costs from Marshall & Swift, and two site surveys were conducted in 1997 and 2004. Table E6 shows the depreciated replacement values for structures in 1999 and 2004. Table E7 shows the content values for the structures in 1999 and 2004.

The 2004 commercial structure content values are based on either an expert panel that was conducted in Houma, Louisiana (1997) or survey of commercial structures in the Lower Mission Creek Floodplain (1997). A 1997 commercial content survey was able to verify the content to structure ratio for retail stores, auto related businesses, light industrial businesses, and warehouses. For the other businesses, the best available information was used, which was the expert panel that was conducted in Houma, Louisiana (1997). The Houma depth-damage relationships were developed from an expert panel meeting (e.g., of Corps of Engineers Economist, Engineers, outside consultants, FEMA, etc.) that was conducted in Houma, Louisiana. Also, the Houma ratios are significant less than ratios used in the 1999 report. The commercial content to structure ratios are listed in Table E8.

The content to structure ratios for residential structures are based on 1997 survey of residential structures. The survey estimated the residential content to structure value to be 64.3-percent.

Table E6
Lower Mission Creek
Total Structure Value and Average Value

	Number of Structures	Structure Value 1999 Price Level	Structure Value 2004 Price Level	Average Value 2004 Price Level
Comm	569	$212,983,000	$239,291,000	$421,000
MFR	312	$52,125,000	$62,316,000	$200,000
Public	35	$35,068,000	$48,513,000	$1,386,000
SFR	225	$12,858,000	$14,706,000	$65,000
Total	1141	$313,034,000	$364,826,000	$320,000

Table E7
Lower Mission Creek
Total Content Value and Average Value

	Number of Structures	Content Value 1999 Price Level	Content Value 2004 Price Level	Average Value 2004 Price Level
Comm	569	$282,220,000	$101,294,000	$178,000
MFR	312	$52,125,000	$27,052,000	$120,000
Public	35	$28,567,000	$63,029,000	$280,000
SFR	225	$8,229,000	$9,456,000	$42,000
Total	1141	$371,141,000	$200,831,000	$176,000

Table E8
Lower Mission Creek
Content Value to Structure Value Ratio

	Content Value to Structure Value Ratio WRDA 2000	Content Value to Structure Value Ratio FY2004
Retail	111%	111%
Auto Related Businesses	120%	120%
Light Industrial Buildings	214%	214%
Warehouses	215%	215%
Restaurants	100%	40%
Public Buildings	25%	37%
Hotels	100%	22%
Apartment Buildings	55%	22%
Office Buildings	100%	91%

B Without Project Damages

The annualized damages to structures (e.g., damages to buildings and contents) are calculated using the HEC-FDA computer program. The model computes annual damages based upon the following input parameters:

1.) Structure data, including structure I.D., category (single-family residences, multi-family residence, public, commercial, industrial), stream location, ground elevation, first floor elevation, and structure value. This data was

developed in a spreadsheet, converted into a text file and imported into the HEC-FDA program.

2.) The calculations of content and structure damages are based on only the base year, since the watershed development is build-out.

3.) The 1999 evaluation determined that the depth/damage relationships provided by FEMA provided the best available information for the Lower Mission Creek Floodplain. Table E9 shows the FEMA depth-damage curves.

4.) Since the 1999 report was completed, U.S Army Corps of Engineers developed generic depth-damage relationships for residential structures. The 2004 evaluation used the depth-damage relationships from EGM 04-01 for calculating damages to residential structures. The residential depth-damage relationships are listed in Table E10. For non-residential structures, the 2004 evaluation used depth-damage relationships that were developed from an expert panel meeting (e.g., of Corps of Engineers Economist, Engineers, outside consultants, FEMA, etc.) that was conducted in Houma, Louisiana. Table E10 shows the non-residential depth-damage curves used in the 2004 report. The damage relationships for non-residential are applied based on the type of construction.

Table E9
Lower Mission Creek
1997 FEMA Depth-Damage Curves

Depth (ft)	Damage to Structures (percent)	Damage to Contents in Residential Structures (percent)	Damage to Contents in Commercial Structures (percent)
-1	0%	0%	0%
0	9%	12%	11%
1	16%	24%	18%
2	25%	33%	24%
3	28%	35%	29%
4	30%	37%	35%
5	31%	41%	40%
6	40%	45%	45%
7	43%	50%	50%
8	43%	57%	55%
9	45%	60%	60%
10	46%	60%	60%

Table E10
Lower Mission Creek
Structure Depth-Damage Curves

	IWR Residential Struct.		Houma Non-residential Structures	
Depths	Damage to Structures (Percent)	Standard Error	Damage to Wood-Frame Structures (percent)	Damage to Masonary Structures (percent)
-1	3%	3%	0%	0%
0	13%	2%	1%	2%
0.5	19%	2%	18%	12%
1	23%	2%	18%	12%
1.5	28%	2%	24%	17%
2	32%	2%	27%	17%
3	40%	2%	31%	22%
4	47%	2%	37%	26%
5	53%	2%	45%	29%
6	59%	2%	45%	30%
7	63%	2%	46%	30%
8	67%	2%	48%	32%
9	71%	2%	52%	42%
10	73%	3%	52%	48%

4) The 2004 evaluation used the guidance in EGM 04-01 to calculate content damage for residential structures. The content depth-damage relationships are based on percentage of structure value instead of the value of contents. Table E11 shows the residential depth-damage relationships for residential content damages for the 2004 evaluation

5) The calculation of content damages for non-residential structures in the 2004 evaluation used the depth-damage relationships that were developed from an expert panel in Houma, Louisiana. The depth-damage relationships were based on a percentage of the structure value. Table E8 shows the content value-to-structure value ratio for different types of structures. The depth-damage relationships for non-residential structures used in the 2004 evaluation in calculating content damages are listed in Table E12.

Table E11
Lower Mission Creek
IWR Generic Depth-Damage Relationships
Residential Structures - Content Damages

Depth (ft)	Damage to Contents in Residential Structures (percent)	Standard Error
-1	2.4%	2.1%
0	8.1%	1.5%
1	13.3%	1.2%
2	17.9%	1.2%
3	22.0%	1.4%
4	25.7%	1.5%
5	28.8%	1.6%
6	31.5%	1.6%
7	33.8%	1.7%
8	35.7%	1.8%
9	37.2%	1.9%
10	38.4%	2.1%

Table E12
Lower Mission Creek
Houma Non-Residential Depth-Damage Relationships
Contents

Depths	Restaurant	Auto Related	Hotels and Apartments	Office Bldgs.	PublicBldgs	Retail	Warehouse and Industrial
-1	0%	0%	0%	0%	0%	0%	0%
-0.5	0%	0%	0%	0%	0%	0%	0%
0	0%	0%	0%	0%	0%	0%	0%
0.5	18%	9%	8%	13%	36%	11%	8%
1	24%	27%	15%	16%	65%	23%	12%
1.5	45%	69%	18%	29%	65%	33%	16%
2	48%	79%	22%	34%	65%	55%	20%
3	77%	87%	38%	65%	90%	69%	27%
4	91%	90%	43%	80%	100%	77%	31%
5	94%	96%	45%	82%	100%	86%	39%
6	94%	96%	45%	90%	100%	94%	46%
7	97%	96%	45%	92%	100%	94%	53%
8	97%	96%	45%	92%	100%	94%	61%
9	97%	96%	45%	92%	100%	94%	68%
10	97%	96%	53%	92%	100%	97%	73%

6) The 2004 evaluation included no changes to the hydrologic and hydraulic data that was used in the 1999 evaluation. The Engineering Division provided the hydrologic and hydraulic data. Also, the data was imported into HEC-FDA program.

7) The 2004 evaluation employed the levee function of the HEC-FDA model to represent flooding conditions within the floodplain. Under this construction, inundation damages are prevented from occurring and flood stages are contained within the channel. For each of the reaches the levee was based on

the estimated elevation of the creek banks. Table E13 lists the elevation of the banks and its corresponding probability event of overtopping the creeks' banks.

8) The HEC-FDA model computes expected annual damages using a Monte Carlo simulation process. The resultant includes the expected annual damages in the study area.

Table E13
Lower Mission Creek
W/O Exceedance Probability Event by Reach

Reach Name	Elevation of the Creek Bank (ft)	Without Project Conditions
Rch 1 LL	33.7	70-yr
Rch 1 Left	34.6	7-yr
Rch 1 Right	38.6	14-yr
Rch 2 LL	26.2	50-yr
Rch 2 Left	28.6	10-yr
Rch 2 Right	28.6	10-yr
Rch 3 LL	24.5	50-yr
Rch 3 Left	24.5	16-yr
Rch 3 Right	24	16-yr
Rch 4 Left	12.2	5-yr
Rch 4 Left X	12.2	5-yr
Rch 4 Right	12.2	5-yr
Rch 4 Right X	15.8	25-yr
Rch 4 Right XX	12.2	5-yr
Rch 4 RRE	17.1	25-yr
Rch 4 RRW	17.5	40-yr
Rch Lag 1	8.5	10-yr
Rch Lag 2	8.5	10-yr

C Risk & Uncertainty Modeling

The two variables subject to R&U variations for the economic determination of stage/damage functions are First Floor Elevation (FFE) and Depreciated Replacement Cost (DRC). For estimating the uncertainty of the FFE, the study team used a normal distribution with a mean of 0 and a standard deviation of .6 feet (based upon guidance contained in EM 1110-2-1619). For DRC uncertainty, a triangular distribution was used for the different types of structures. The mean value for the uncertainty function was based on the estimated value of the structure. The lower and higher limits for the triangular function were based on lower and higher classifications listed in Marshall & Swift. Table E14 lists the lower and higher limits for different types of structures.

Also, the depth damage relationships for residential buildings include a standard error of the percent damages for each depths of flooding. Table E10 and E11 show the standard error for structures and contents respectively.

Table E14
Lower Mission Creek
Triangular Distribution of the Depreciation Replacement Structure Values
The Percentage Change in the Median Value to the Lower and Higher Limit Values

Occ. #	Description	Lower Limit %Change	Higher Limit %Change
1	Single Family (1 Floor)	10.6%	10.6%
2	Single Family (2 Floors)	10.6%	10.6%
11	Duplex (1 Floor)	9.8%	8.6%
12	Duplex (2 Floors)	9.8%	8.6%
13	Duplex (3 Floors)	9.8%	8.6%
14	Apartment (1 Floor)	9.8%	8.6%
15	Apartment (2 Floors)	9.8%	8.6%
16	Apartment (3 Floors)	17.3%	15.1%
17	Apartment (4 Floors)	17.3%	15.1%
18	Hotel (1 Floor)	13.4%	29.3%
19	Hotel (2 Floors)	13.4%	29.3%
20	Hotel (3 Floors)	13.4%	29.3%
21	Hotel (4 Floors)	13.4%	29.3%
111	Retail (1 Floor)	22.5%	22.2%
112	Retail (2 Floors)	22.5%	22.2%
113	Auto Sales-Repair	21.8%	26.6%
114	Office Building (1 Floor)	24.5%	25.5%
115	Office Building (2 Floors)	24.5%	25.5%
116	Office Building (3 Floors)	24.5%	25.5%
117	Office Building (4 Floors)	24.5%	25.5%
118	Light Industrial Building	22.7%	25.5%
119	Warehouse	23.5%	27.1%
120	Restaurant	24.7%	24.5%
1111	Government Buildings	21.6%	24.5%
1112	Churches	20.2%	21.0%
1113	Utilities	18.4%	24.4%
1114	Social Clubs	25.9%	27.2%
1115	Schools	18.6%	18.4%

D R&U Hydrology/Hydraulic Variable Parameters

The hydrologic engineering relationships allowed by the HEC-FDA model to fluctuate are the frequency/discharge function and the stage/discharge function. For the frequency/discharge relationship, the model used the graphical approach to compute a statistical distribution of the possible discharges. This statistical distribution was based upon the data contained in the water surface profiles and the equivalent record lengths that were estimated for each reach. For the reaches located in the Lower Mission Creek floodplain had an equivalent record length of 27. The reaches in Laguna Channel floodplain had an equivalent record length of 15. The Engineering Division provided the data. For the stage/discharge relationship, a normal distribution is assumed for the uncertainty data. The data included standard errors for the 10-year, 25-year, 50-year, and 100-year event. Table E15 shows the standard errors for each of the reaches.

Table E15
Lower Mission Creek
W/O Standard Error of Water Surface Elevation

Reach Name	Index Location	10-year	25-year	50-year	100-year	500-year
Rch 1 L	5115	0.10	0.31	0.64	0.94	0.94
Rch 1 LL	4370	0.00	0.00	0.00	0.90	0.90
Rch 1 R	5115	0.10	0.31	0.64	0.94	0.94
Rch 2 L	4370	0.09	0.27	0.57	0.93	0.93
Rch 2 LL	3002	0.00	0.00	0.42	0.90	0.90
Rch 2 R	4370	0.09	0.27	0.57	0.93	0.93
Rch 3 L	2842	0.25	0.53	0.88	0.94	0.94
Rch 3 LL	2842	0.00	0.00	0.33	0.90	0.90
Rch 3 R	3842	0.25	0.53	0.88	0.94	0.94
Rch 4 L	1765	0.10	0.29	0.67	0.92	0.92
Rch 4 R	1765	0.10	0.29	0.67	0.92	0.92
Rch 4 RRE	1510	0.00	0.00	0.35	0.90	0.90
Rch 4 RRW	1510	0.00	0.00	0.27	0.90	0.90
Rch lag 1	1000	0.00	0.48	0.66	0.90	0.90
Rch lag 2	1680	0.00	0.10	0.70	0.90	0.90

E Structure and Content Damages

Table E16 shows the total structure and content damages calculated by the HEC-FDA program for the 1999 evaluation and 2004 evaluation. Table E17 lists the median value of damages for each probability event.

Table E16
Lower Mission Creek
Without Project Damages
"(000)

	Without Project Damages 1999 Price Level	Without Project Damages 2004 Price Level
Reach 1	$193.7	$294.3
Reach 2	$407.5	$584.7
Reach 3	$74.1	$116.5
Reach 4	$1,209.4	$1,303.7
Reach Lag 1	$1,744.8	$2,266.9
Reach Lag 2	$87.1	$70.7
Total	$3,716.6	$4,636.8

Table E17
Lower Mission Creek
Median Expected Structural and Content Damages
For Probability Events
'(000)

Stream	10-year	25-year	50-year	100-year	500-year
Lower Mission Creek	$1,400	$14,200	$31,000	$53,100	$105,000
Laguna Channel	$86	$15,100	$35,600	$54,700	$78,800
Total Median Damages	$1,486	$29,300	$66,600	$107,800	$183,800

F Bank Stabilization Costs

The channel capacity of Lower Mission Creek depends on the stability of the creek banks. It is expected that erosion will threaten the creek's banks. Santa Barbara Flood Control Agency is responsible with rebuilding the creek's bank. The agency will spend an average of $41,600 (37,500,1999 price level) per year to maintain the banks.

5 Nonstructural Damages

A Emergency/Cleanup Costs

Emergency/cleanup costs include losses and above physical flood damages which result from the disruption of normal activities. Emergency costs include those costs that would not otherwise be incurred except for flooding. These costs include evacuation and re-occupation of the floodplain, flood fighting, disaster relief and increases in normal operations of police, fire, medical, governmental and industry activity. Clean-up costs include the costs of removing and disposing sediment that covered the streets, parking lots, and public property.

Calculation of emergency/cleanup costs in the Lower Mission Creek Floodplain is based on conversations with city officials responsible for flood fighting efforts and the cleanup efforts after the flooding occurred in 1995. Separate storm events in 1995 were estimated to be about a 55-year and a 9-year storm event. The EAD analysis for both the Lower Mission Creek floodplain and Laguna Drainage calculated the annual damages for emergency/cleanup to be $130,000 ($118,400,1999 price level).

Table E18
Lower Mission Creek
Emergency and Cleanup Costs
'(000)

Frequency	1999 Price Level	2004 Price Level
9-year	$240	$266
55-year	$1,438	$1,596
100-year	$2,065	$2,292
500-year	$3,740	$4,151
EAD	$118	$130

B FEMA- Temporary Rental Assistance/Emergency Home Repairs

FEMA provides grants to assist individuals and families to find suitable housing when they are displaced in cases of federally declared disasters. This assistance being directly attributable to the disaster and being an expenditure that would not be undertaken except for the disaster falls clearly under the emergency costs guidance of ER1105-2-100. Therefore, funds expended by FEMA for Temporary Rental Assistance (TRA) or Funds for Minor Emergency Home Repairs (FMEHR) in the event of flooding are NED flood damages.

Complying with ER 1105-2-100, an Internet database search of FEMA disaster reports for flood and storm damage was performed. Table E19 shows a compilation of the various FEMA reports related to flood and storm.

Table E19 shows the average per claim expenditure by FEMA for TRA ranged from $583 to $2,034 with an overall average expenditure of $1,537 per claim. The standard deviation of the average per claim expenditures is $411.

For risk-based modeling purposes it is assumed that TRA per claim expenditure is normally distributed with a mean of $1,537 and a standard deviation of $411. The mean of $1,537 was applied as other value to each residential structure (single family and multiple family residences) in the HEC-FDA model. The HEC-FDA calculated the TRA for the without project conditions to be $17,200.

Table E19
Lower Mission Creek
TRA Average Expenditure

	Date	Temporary Rental Assistance	TRA Claims	$ per Claim
Addrew, Iron etc.,MO	Apr-99	$328,233	341	$963
Kansas	Jan-99	$3,380,199	2388	$1,415
Kansas & Missouri	Oct-98	$3,335,504	3762	$887
South, Central and Southeast Texas	Oct-98	$28,047,095	13786	$2,034
Southeast Texas	Sep-98	$4,190,165	2159	$1,941
Southwest Texas	Aug-98	$2,156,601	1445	$1,492
Wisconsin	Aug-98	$7,000,173	5221	$1,341
St. Louis City & County, MO	Jul-98	$1,300,000	2231	$583
Massachusetts	Jun-98	$5,400,000	3527	$1,531
Oregon	Jun-98	$215,294	132	$1,631
North Carolina	Jan-98	$1,213,285	703	$1,726
California	1998	$22,000,000	15000	$1,467
Georgia	1998	$3,100,000	2455	$1,263
Totals		$81,666,549	53150	$1,537

C Transportation Loss

Flooding in the Lower Mission/Laguna Channel drainage area has impeded automobiles and the railroad traffic within the City of Santa Barbara. Even the threat of flooding and concern for public safety may make it necessary to detour traffic. The transportation losses are determined by calculating the additional operating cost by taking alternative routes and the traffic costs per passenger.

The calculations of transportation losses are based upon the technical guidance of Institute of Water Resources Report 1-R-12, " Value of Time Saved for Use of Corps Planning Studies: Review of the Literature and Recommendations."

The expected transportation losses by event in the Lower Mission Creek/Laguna Channel are listed in Table E20. The expected annual transportation losses totaled $19,200

Table E20
Lower Mission Creek
Expected Transporation Losses
'(000)

Drainage Area	25-year	50-year	100-year	500-year
Cost of Time of Delay for Traffic	$95	$180	$256	$1,510
Cost of Mileage for Traffic	$31	$54	$65	$100
Total Traffic Losses	$127	$234	$321	$1,610
Railroad Losses (Amtrak)	$0	$24	$24	$32
Total Losses	$127	$258	$345	$1,643

6. Summary of Without Project Damages

The expected annual damages in the Lower Mission Creek/Laguna Channel Floodplain are shown in Table E21.

Table E21
Lower Mission Creek
Without Project Expected Annual Damages Summary
FY 2004 Price Level
'(000)

Type	Damages
Structural/Contents Inundation (Lower Mission Creek)	$2,299.2
Structural/Contents Inundation (Laguna Channel)	$2,337.6
Emergency/Clean-up	$130.0
Traffic Disruption	$19.2
Bank Stabilization	$41.6
TRA	$17.2
Total	$4,844.8

7 With Project Analysis

In 1999, the feasibility study identified the most cost-effective means of providing flood protection in the study area. The plan that is most cost-effective is the plan that maximizes contributions to National Economic Development (NED) minus the cost to implement the plan or the net benefits. The plan selected will provide 20-year level of protection and have a channel capacity of 3,400 cfs.

A NED Alternative: 3,400 cfs. Capacity with Oxbow Bypass – Stabilized sides combination vertical wall and riprap.

This alternative will increase the channel capacity to 3,400 cfs and would provide approximately a 20-year level of protection. Natural bottom will be maintained and creek

banks would consist of combination vertical wall and riprap. The bottom half of the bank will consist of vertical walls while the upper half will be built with riprap at a 1.5:1(H:V) slope. The riprap would be covered with topsoil while concrete pipes in varying sizes (up to a maximum of three feet in diameter) will be strategically placed in between the riprap to allow planting of native coastal trees and vegetation.

Upstream of Highway 101, the combination riprap-vertical wall will be the predominant bank treatment, except in two short reaches just upstream of Haley-De La Vina Bridge and De La Guerra Bridge. Below Highway 101, the combination vertical wall and riprap will be applied along the southeast bank, starting from midway between Chapala Bridge and Mason Bridge to State Street, and along the middle third of the southwest bank between Mason Street and State Street. Vertical walls will be maintained for the remainder of this reach. The improved creek would generally follow the existing alignment and will incorporate a new culvert between Highway 101 and Chapala Street Bridge that will bypass the oxbow. The oxbow will be left in place functioning as the flow channel. Four bridges along the study reach would be replaced including Ortega Street, Cota Street, De la Vina Street, and Mason Street Bridge.

B Annual Cost for NED Plan –2004 Evaluation

The construction cost for NED Plan will be amortized over the 50-year project life. Project cost includes Interest During Construction (IDC) and operation and maintenance cost. A summary of the project costs for the NED Plan is listed in Table E22. Also, Table E22 includes the annual cost calculated for the 1999 evaluation.

Table E22
Lower Mission Creek
Project Costs for NED Alternative
Price Level = 2004

Cost Description	NED Plan Costs
Real Estate	$6,582,200
Removal and Relocation	$663,800
Bridge Construction	$3,156,300
Channels Construction	$10,794,700
PED	$2,425,100
Construction Management	$1,171,300
Contingency	$3,103,600
Subtotal Costs	$27,897,000
Total IDC	$1,516,700
Total Gross Investment	$29,413,700
Total Annual Costs	$1,769,200
Annual OMRR&R Costs	$30,000
2004 Total Annual Costs	$1,799,200
1999 Total Annual Costs	$1,367,000

C Structural Damages for the With Project Conditions

With Project Damages – The evaluation of 3,400 cfs alternatives

The methodology used in calculating the damages for the without project condition was applied to the evaluation of damages for the NED Plan. The model evaluated the annual damages for the 3,400 cfs channel based on the following input parameters:

1.) The economic information for 3,400 cfs alternatives is the same economic information that was used in calculating the without project damages, except for structures that are expected to be demolished. Table E25 lists the structures that are expected to be demolished with the NED Plan.
2.) Hydrology and Hydraulics Sections provided water surface profiles for all reaches. Based these water surface profiles; the calculation of the frequency/discharge and stage/discharge relationships were computed for all the reaches.
3.) This analysis employed the levee function of the model to represent flooding conditions within floodplain. The levee function prevents damages occurring when the water elevation is lower than height of the bank. For each of the reaches the levee was based on the estimated water elevation of the creeks banks. Table E23 lists the elevation of the levee and its corresponding probability event of overtopping. The NED Plan is expected to provide 20-year level of protection. However, some of the reaches provide significant higher-level of protection than 20-year level of protection. In addition, the evaluation of the 20-year level of protection excludes Laguna Channel from the evaluation, since it was based on the frequency of flooding on Lower Mission Creek.

Table E23
Lower Mission Creek
With Project Conditions
Exceedance Probability Event by Reach

Reach Name	Elevation of the Non-Damaging (ft)	With Project Conditions
Rch 1 LL	34	250-yr
Rch 1 Left	40.3	23-yr
Rch 1 Right	40.3	23-yr
Rch 2 LL	26.3	90-yr
Rch 2 Left	28.5	50-yr
Rch 2 Right	28.5	50-yr
Rch 3 LL	24.3	100-yr
Rch 3 Left	24.3	50-yr
Rch 3 Right	25.7	50-yr
Rch 4 Left	14.4	50-yr
Rch 4 Left X	14.4	50-yr
Rch 4 Right	13.1	26-yr
Rch 4 Right X	16	100-yr
Rch 4 Right XX	13.7	35-yr
Rch 4 RRE	17.4	82-yr
Rch 4 RRW	17.5	90-yr
Rch Lag 1	8.5	14-yr
Rch Lag 2	8.5	11-yr

4) The without project parameters for risk and uncertainty were used for the evaluation of 3,400 cfs alternatives, except for the standard error relating to the stage/discharge relationships. The standard errors for the with project condition: 10-year, 25-year, 50-year, and 100-year frequencies. Table E24 shows the calculated standard errors for the each of the reaches.

Table E24
Lower Missin Creek
Standard Error of Water Surface Elevation
With Project Conditions

Reach Name	Index	10-year	25-year	50-year	100-year	500-year
Rch 1 L	5115	0.10	0.34	0.71	0.97	0.97
Rch 1 LL	4370	0.00	0.00	0.00	0.00	0.90
Rch 1 R	5115	0.11	0.34	0.71	0.97	0.97
Rch 2 L	4370	0.10	0.32	0.68	0.94	0.94
Rch 2 LL	3002	0.00	0.00	0.00	0.90	0.90
Rch 2 R	4370	0.10	0.32	0.68	0.94	0.94
Rch 3 L	2842	0.30	0.65	0.92	0.95	0.95
Rch 3 LL	2842	0.00	0.00	0.00	0.90	0.90
Rch 3 R	3842	0.30	0.65	0.92	0.95	0.95
Rch 4 L	1765	0.14	0.39	0.69	0.92	0.92
Rch 4 R	1765	0.14	0.39	0.69	0.92	0.92
Rch 4 RRE	1510	0.00	0.00	0.00	0.90	0.90
Rch 4 RRW	1510	0.00	0.00	0.00	0.90	0.90
Rch lag 1	1000	0.00	0.48	0.66	0.90	0.90
Rch lag 2	1680	0.00	0.09	0.30	0.90	0.90

5) The description of the alternatives includes a wider channel than current channel. Table E25 lists the properties that will be eliminated due to the construction of a wider channel. The cost to demolish the structures is included in the real estate cost estimate in Table E22. Since the structures are removed, the value of the structures is equal to zero. The value of the structure and contents were deleted from the structure database.

Table E25
Lower Mission Creek
Structures Removed from the Floodplain

Structure Address	No. of Stuct	Type	Reach
326 W. De la Guerra St.	1	Residential	Reach 1 R
303 W. Ortega St.	1	Residential	Reach 1 L
633 Bath St	2	Residential	Reach 1 L
631 Bath St	3	Residential	Reach 1 L
434 De la Vina St.	1	Residential	Reach 2 R
15 W. Mason	1	Commercial	Reach 4 L

6) The evaluation of the NED Plan was completed, after all the parameters and data were inputted into the HEC-FDA program. Table E26 (1999) and E27 (2004) show the total average damages and benefits for the NED Plan.

Table E26
Annual Benefits for NED Plan (1999)
Structure and Content Damages
1999 Price Level
"(000)

	Without Project Damages 1999	With Project Damages 1999	Total Benefits 1999
Reach 1	$193.7	$100.0	$93.7
Reach 2	$407.5	$252.8	$154.7
Reach 3	$74.1	$45.4	$28.7
Reach 4	$1,209.4	$614.6	$594.8
Reach Lag 1	$1,744.8	$1,291.8	$453.0
Reach Lag 2	$87.1	$45.5	$41.6
Total	$3,716.6	$2,350.1	$1,366.5

Table E27
Annual Benefits for NED Plan (2004)
Structure and Content Damages
2004 Price Level
"(000)

	Without Project Damages 2004	With Project Damages 2004	Total Benefits 2004
Reach 1	$294.3	$159.5	$134.8
Reach 2	$584.7	$367.4	$217.3
Reach 3	$116.5	$75.2	$41.3
Reach 4	$1,303.7	$649.9	$653.8
Reach Lag 1	$2,266.9	$1,621.6	$645.3
Reach Lag 2	$70.7	$36.7	$34.0
Total	$4,636.8	$2,910.3	$1,726.5

D Reduction of the Bank Stabilization Costs

Since the NED Plan is expected to have a channel that is stabilized by concrete or riprap, each alternative is expected to have zero cost for bank stabilization. The annual benefit from the reduction in bank stabilization costs is $41,600.

E Reduction in Emergency and Clean-up Damages

The NED Plan is expected to reduce the frequency of flooding in the floodplain. The costs relating to evacuation, disaster relief and the clean-up of sediment will be reduced due to reduction in the frequency of flooding. Based on the reduction of frequency of flooding the EAD program calculated a reduction in the cost of the clean-up costs and emergency costs. The NED Plan is expected to reduce the annual damages from emergency/clean-up damages from $130,000 to $51,400. The total benefit from the reduction in emergency/clean-up damages is $78,600.

F Reduction in FEMA-Temporary Rental Assistance TRA costs

The implementation of the NED Plan is expected to reduce TRA costs for residential structures in the floodplain. Also, the parameter of $1,537 per residential structure was used in the HEC-FDA model for calculating the TRA damages. The average annual TRA damage amount occurring after implementation of the NED Plan is $13,400. Since the without project condition is $17,200, the TRA is net annual benefit is $3,800.

G Reduction in Transportation Losses – With Project

Based on the maps from the Hydrology & Hydraulics Branch, showing the reduction in the time duration of flooding with the implementation of the NED plan, it is expected that transportation losses will be reduce. The expected transportation losses by event for the Lower Mission Creek/Laguna Channel are listed in Table E28. The expected annual transportation losses totaled $15,200. Since the without project losses equal 19,200, the total annual benefits for the project is $4,000.

Table E28
Lower Mission Creek
Expected Transporation Losses
With Project Conditions

Drainage Area	25-year	50-year	100-year	500-year
Cost of Time of Delay for Traffic	$64	$120	$219	$1,412
Cost of Mileage for Traffic	$21	$37	$56	$93
Total Traffic Losses	$85	$157	$275	$1,505
Railroad Losses (Amtrak)	$0	$24	$24	$32
Total Losses	$85	$182	$299	$1,538

H Savings in Flood Insurance Overhead

The flood insurance costs that can be saved by alleviating a flood threat are the overhead and administrative cost of processing applications and operating the National Flood Insurance Program. Computer Sciences Corporation provided a list of all the FEMA policyholders within the Lower Mission Creek and Laguna Channel 100-year floodplain. The number of policies that are within the without project conditions 100-year floodplain is 237 policies. Based on the implementation of the NED Plan the size of the 100-year floodplain will be reduced, causing the number of policies in the 100-year flood plan to be 174. By implementing the NED Plan, it expected that 63 policies would not be needed. The current overhead cost per policy in 2004 is $161 per policy. The NED Plan will provide annual benefit of $10,100 by reducing the administrative cost of FEMA policyholders.

I Advance Bridge Replacement Benefit

The proposed alternatives include the construction of new bridges. The expected lives of the replacement bridges are expected to be greater than that of the existing structures, thereby extending the service life of the bridges. Since the total cost of the new bridge is included in the first cost of the project, a credit for this extension is calculated for the benefit side. A credit is also calculated for the reduction in O&M costs that will occur during the remaining life of the existing facility. A detail list showing the remaining life of bridges, maintenance cost of old bridge, life expectancy of new bridge, future annual maintenance cost, cost of the new bridge, annual maintenance benefits, and annual bridge replacement benefits is listed in Table E29.

The advance bridge replacement benefit for the De la Vina Street Bridge was based on the incremental cost for enlarging the bridge's conveyance. The estimated reduction in annual maintenance cost for the new bridge at De la Vina Street was not included in the benefit analysis.

Table E29
Lower Mission Creek
Advance Bridge Replacement

Bridge	Remaining life	Annual Maint Cost	Life Expectancy (New Bridge)	Future Maint	Bridge Cost	Annual Maint Benefit	Bride Replace Benefit
Mason St.	7	$1,500	50	$250	$108,000	$1,250	$42,900
Ortega St.	7	$7,500	50	$250	$757,900	$7,250	$23,800
Cota St.	7	$5,000	50	$250	$770,500	$4,750	$30,100
De la Vina St.	7	$5,000	50	$250	$598,100	$0	$30,500
Total Benefits						$13,250	$127,300

8 Benefits and Costs of NED Plan

After completing a re-evaluation of the original NED Plan authorized in WRDA 2000, the NED Plan has over $278,000 in net benefits and benefit/cost ratio of 1.15. The construction costs for the NED Plan have increased over 50-percent since the project was authorized in 2000. However, the higher costs for the project have been moderated by a 1-percent drop in discount rate. The lower discount rate reduces the annual cost for the construction costs and IDC costs.

The annual benefits for the NED Plan have greatly increased since WRDA 2000, due to increases in building costs, changes in the depth damage relationships, and the higher costs for bridges. First, the building costs in the region have increased over 7-percent in last year. Secondly, the use of the new depth damage relationships for residential and non-residential structures have provided some of the increases in the annual benefits due to the reduction in content and structure damages. Finally, the higher advanced bridge replacement benefit is due to higher cost estimates for the new bridges.

Table E30 provides a comparison of the benefit and cost analysis for the 2004 and 1999 evaluation. Based on the current information for benefits and cost for the NED Plan, it is expected that the project will provide positive net benefits into the future.

Table E30
Lower Mission Creek
Annual Benefits and Costs
National Economic Development Account
Data in (000)

Project Benefits and Costs Red of Struct & Content Damages	NED Plan 2004 Price Level	NED Plan 1999 Price Level
Commercial	$1,422	$1,176
Multi-Family	$252	$108
Public	$67	$53
Single Family	$57	$30
Total Reduction of Damages	$1,798	$1,367
Advance Bridge Replacement	$127	$88
Red Bridge Maint	$13	$13
Red. Clean-up/Emergency	$79	$75
Red. FEMA Overhead	$10	$8
Red. TRA	$4	NA
Red. Bank Stabilization	$42	$37
Red. Transportation Losses	$4	$4
Total Annual Benefits	$2,077	$1,592
Annualized Investment Cost	1769	1337
Annual OMRR&R	$30	$30
Total Annual Cost for Project	$1,799	$1,367
Net Benefits	$278	$225
Benefit/Cost Ratio	1.15	1.16